

FIG. 1

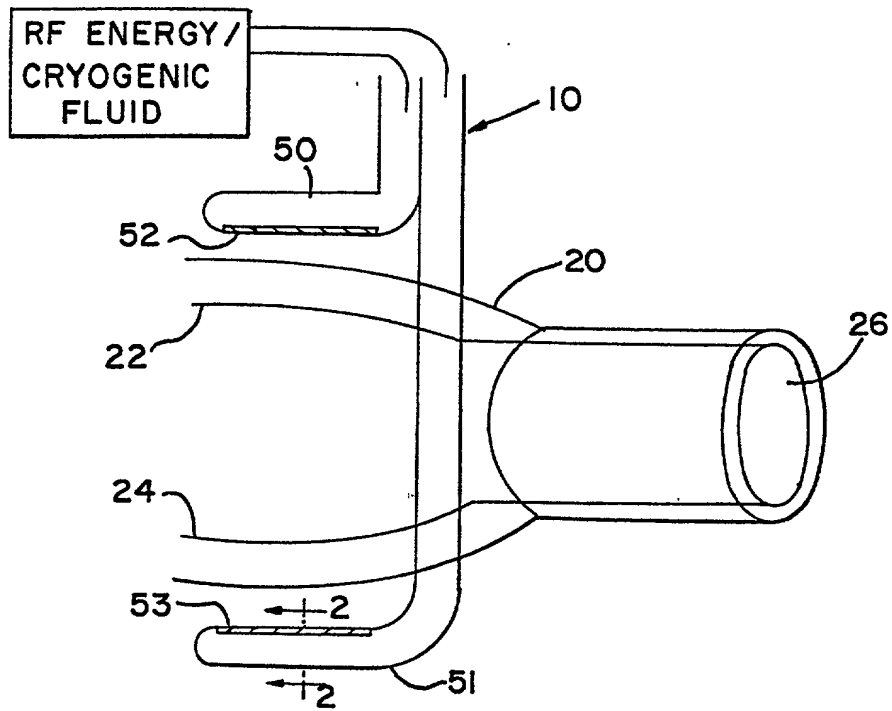


FIG. 2

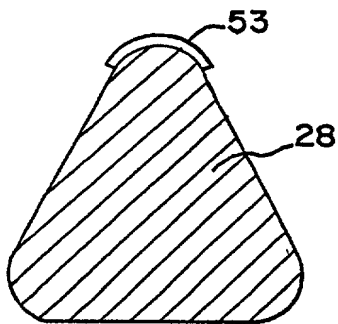


FIG. 3

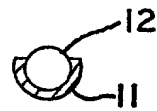


FIG. 4

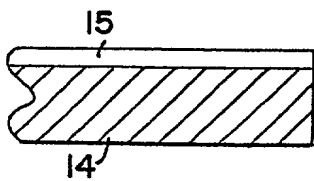


FIG. 5

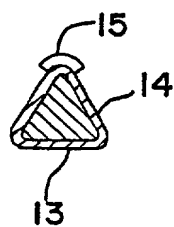


FIG. 6

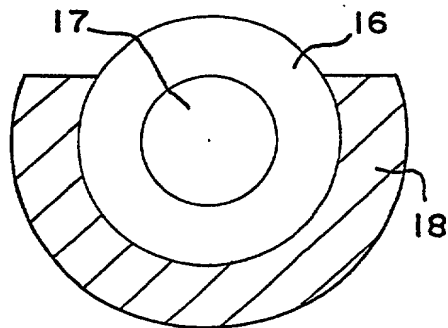


FIG. 7

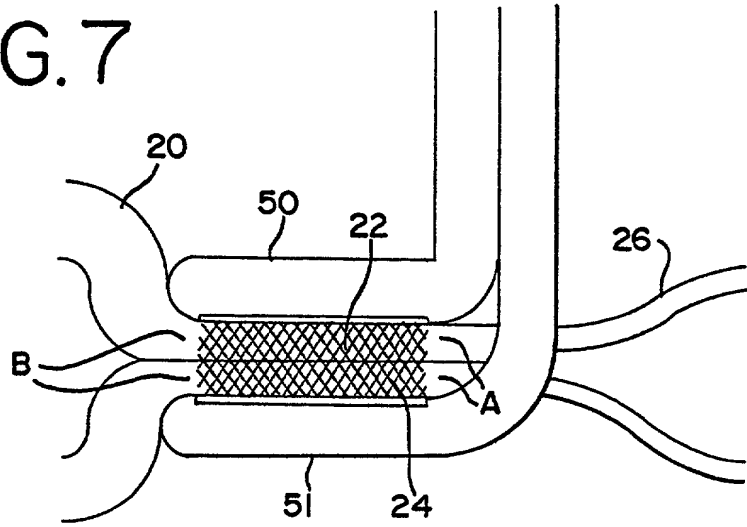


FIG. 8

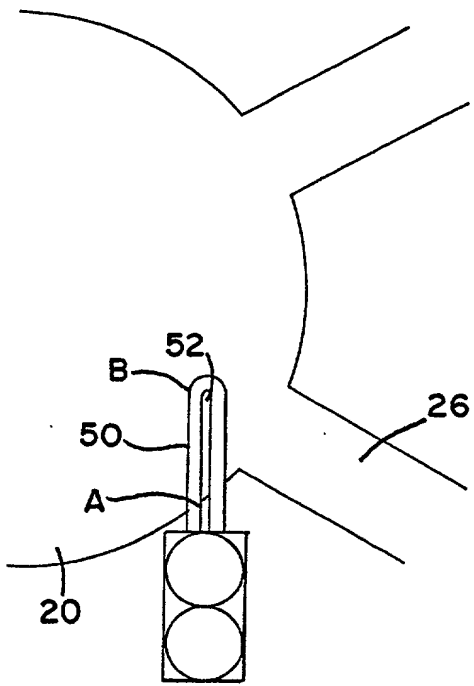


FIG. 9

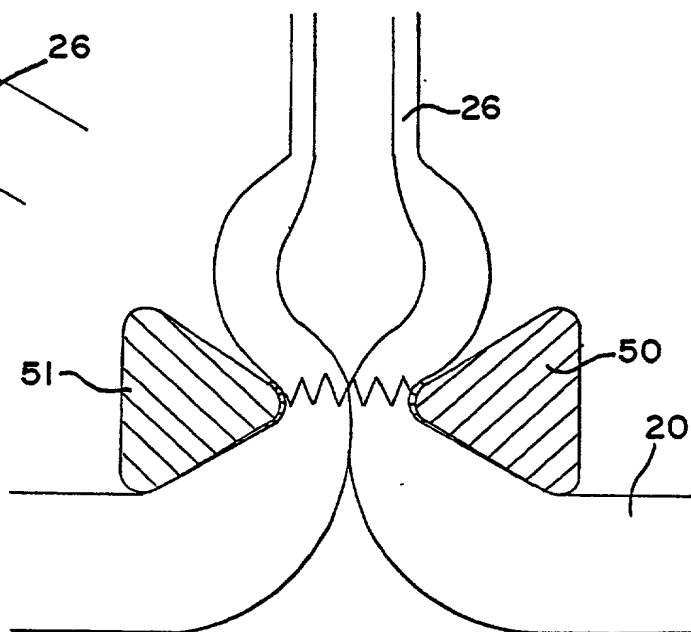


FIG.10

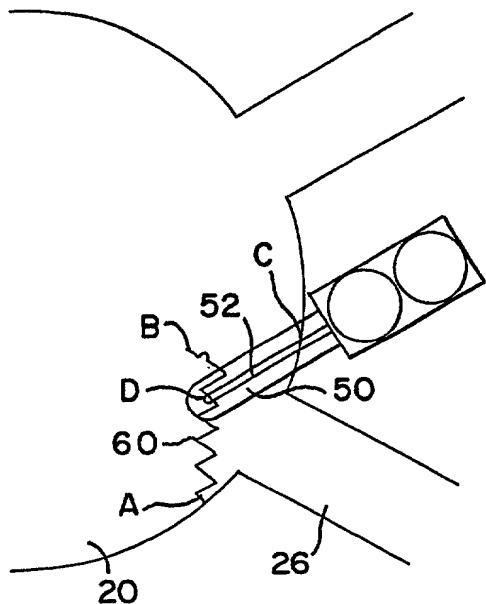


FIG.11

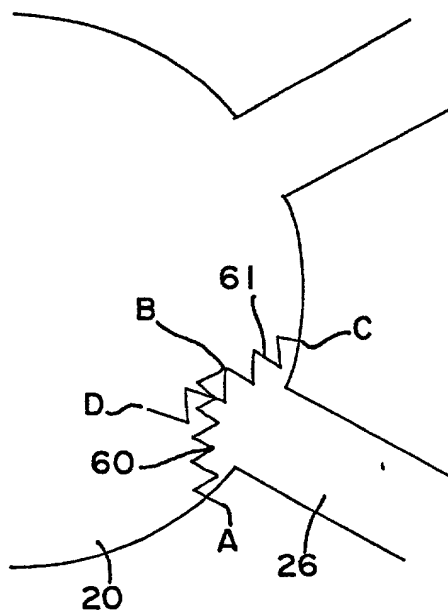


FIG.12

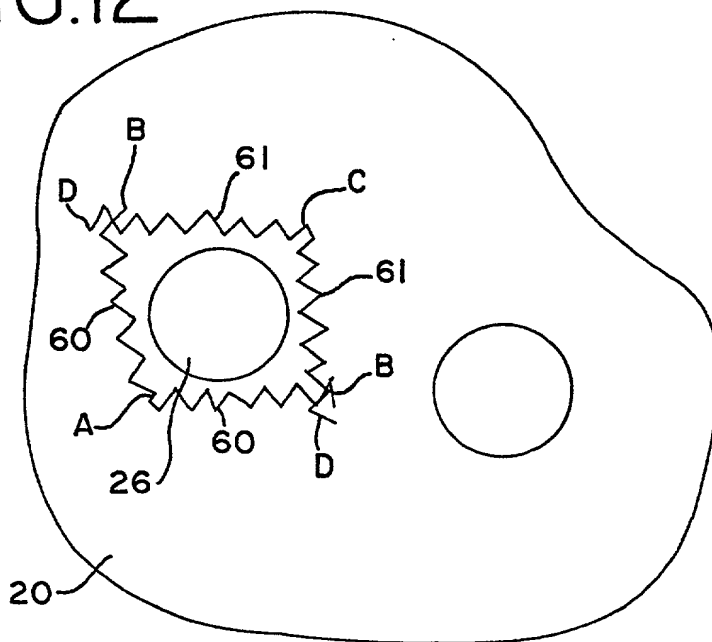


FIG. 10, FIG. 11, FIG. 12, FIG. 13, FIG. 14, FIG. 15, FIG. 16, FIG. 17, FIG. 18, FIG. 19, FIG. 20, FIG. 21, FIG. 22, FIG. 23, FIG. 24, FIG. 25, FIG. 26, FIG. 27, FIG. 28, FIG. 29, FIG. 30, FIG. 31, FIG. 32, FIG. 33, FIG. 34, FIG. 35, FIG. 36, FIG. 37, FIG. 38, FIG. 39, FIG. 40, FIG. 41, FIG. 42, FIG. 43, FIG. 44, FIG. 45, FIG. 46, FIG. 47, FIG. 48, FIG. 49, FIG. 50, FIG. 51, FIG. 52, FIG. 53, FIG. 54, FIG. 55, FIG. 56, FIG. 57, FIG. 58, FIG. 59, FIG. 60, FIG. 61, FIG. 62, FIG. 63, FIG. 64, FIG. 65, FIG. 66, FIG. 67, FIG. 68, FIG. 69, FIG. 70, FIG. 71, FIG. 72, FIG. 73, FIG. 74, FIG. 75, FIG. 76, FIG. 77, FIG. 78, FIG. 79, FIG. 80, FIG. 81, FIG. 82, FIG. 83, FIG. 84, FIG. 85, FIG. 86, FIG. 87, FIG. 88, FIG. 89, FIG. 90, FIG. 91, FIG. 92, FIG. 93, FIG. 94, FIG. 95, FIG. 96, FIG. 97, FIG. 98, FIG. 99, FIG. 100

FIG. 13

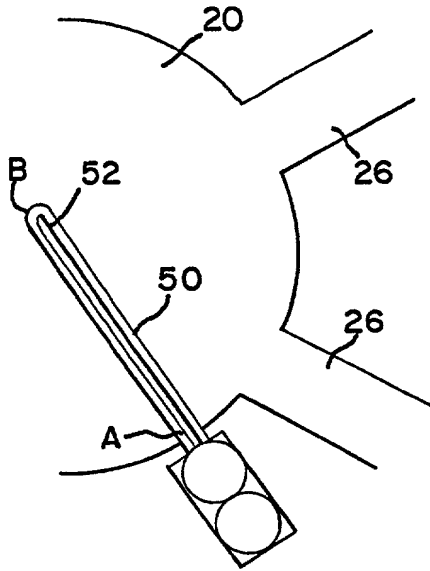


FIG. 14

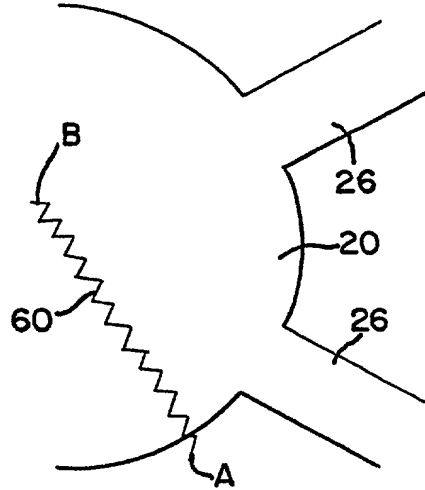


FIG. 16

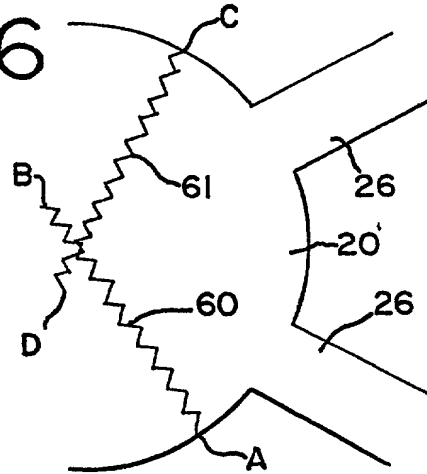


FIG. 15

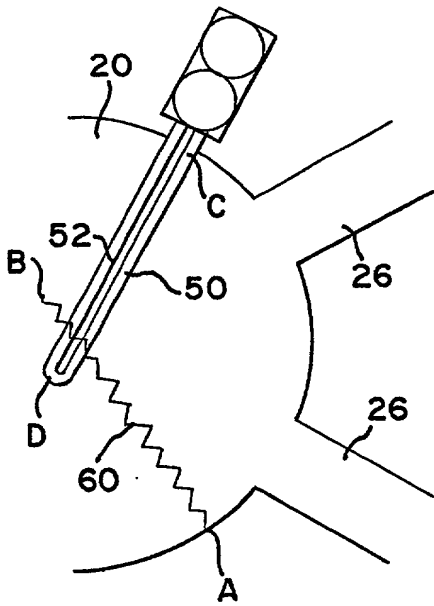


FIG. 17

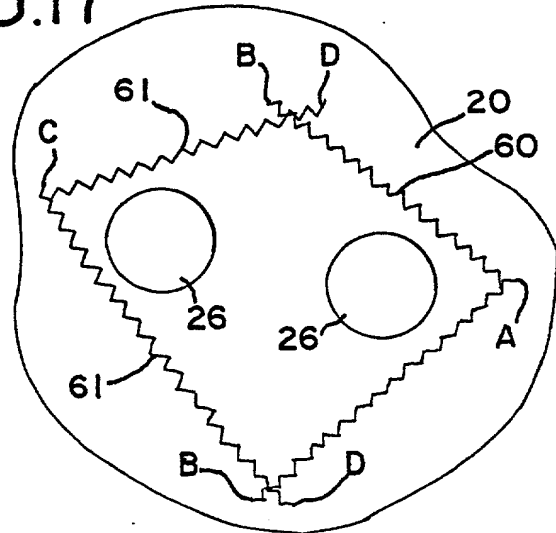


FIG. 19 is a perspective view of the device in a second configuration, showing the curved member 20 and the handle 26. The device is shown in a curved, hook-like shape. The handle 26 is at the top, and the curved member 20 is at the bottom. A small, shaded, hook-like structure 51 is attached to the curved member 20. A larger, shaded, hook-like structure 50 is attached to the handle 26.

FIG. 19

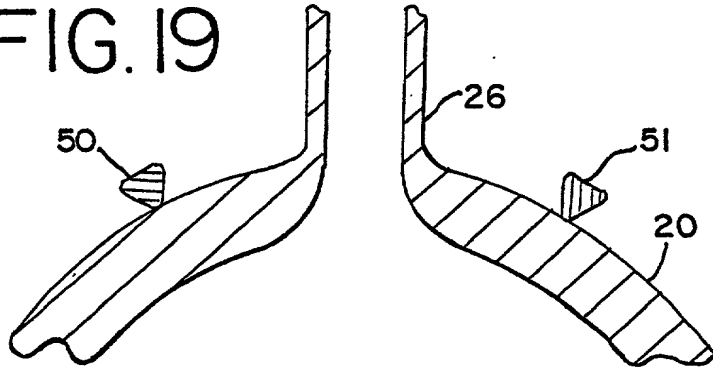


FIG. 18

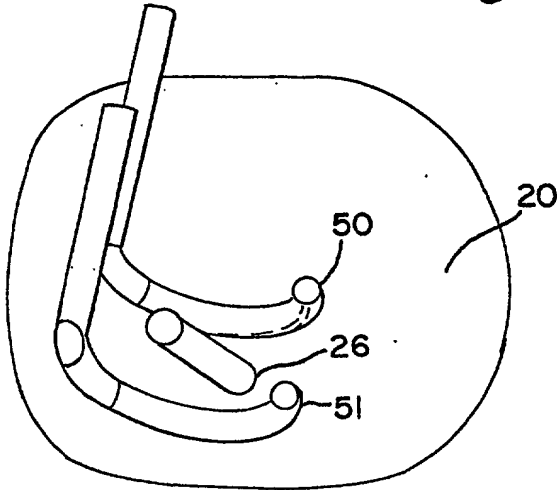


FIG. 21

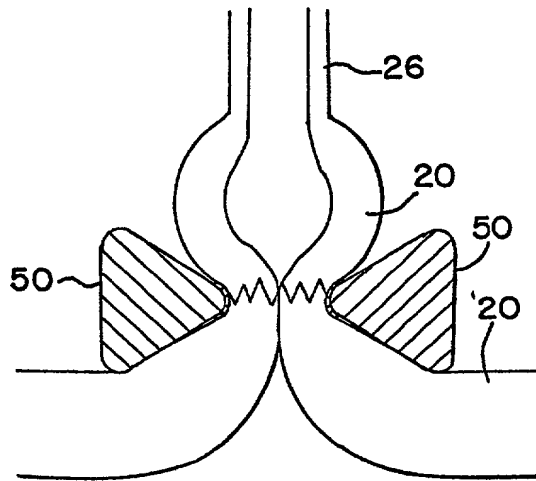


FIG. 20

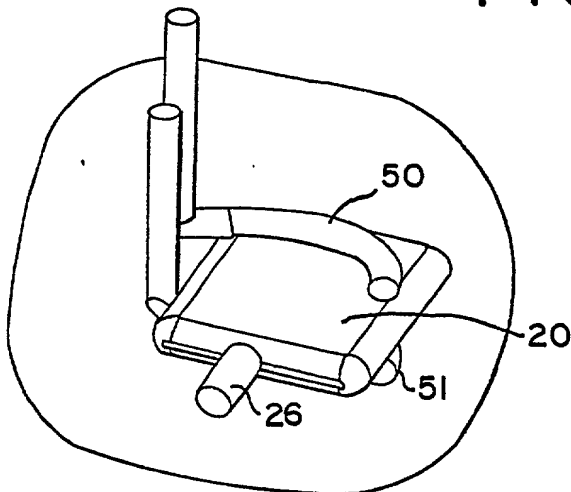


FIG. 22

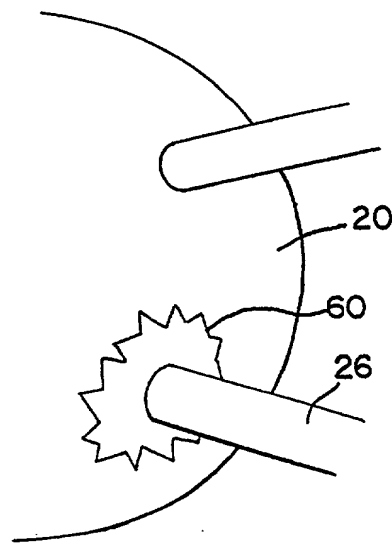


FIG.24

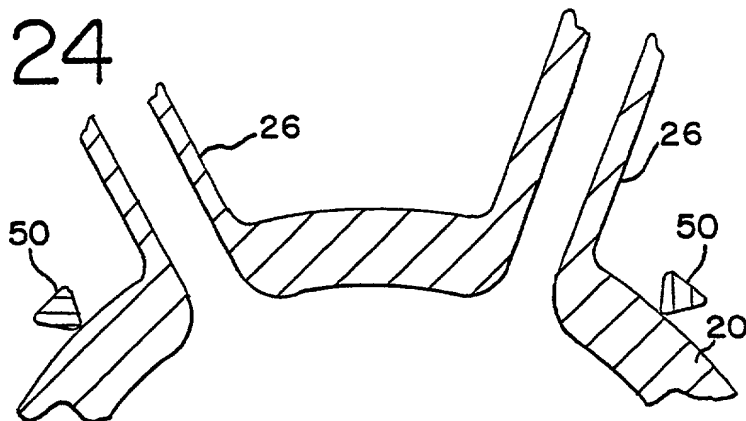


FIG.23

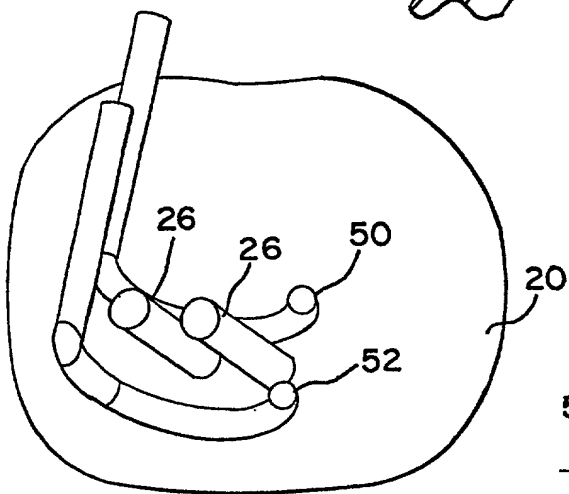


FIG.26

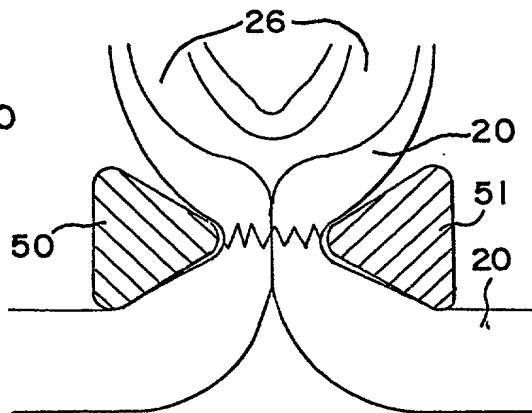


FIG.25

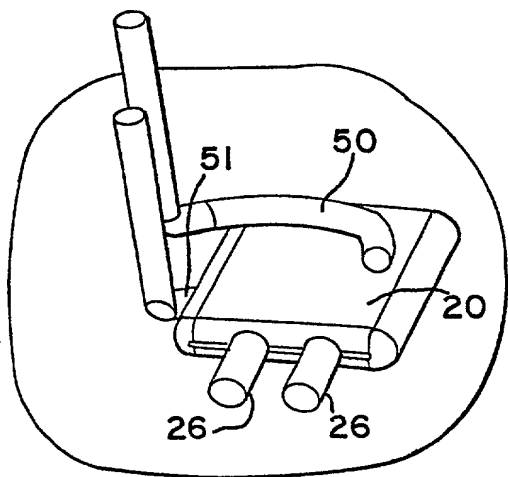
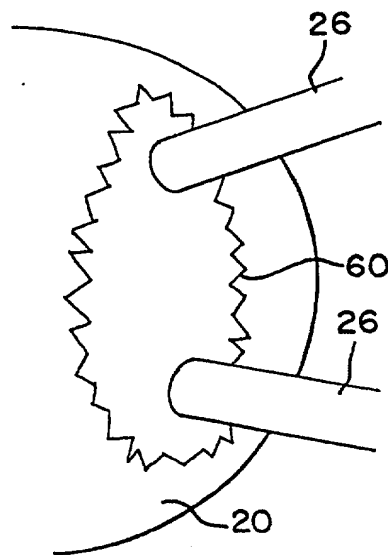


FIG.27



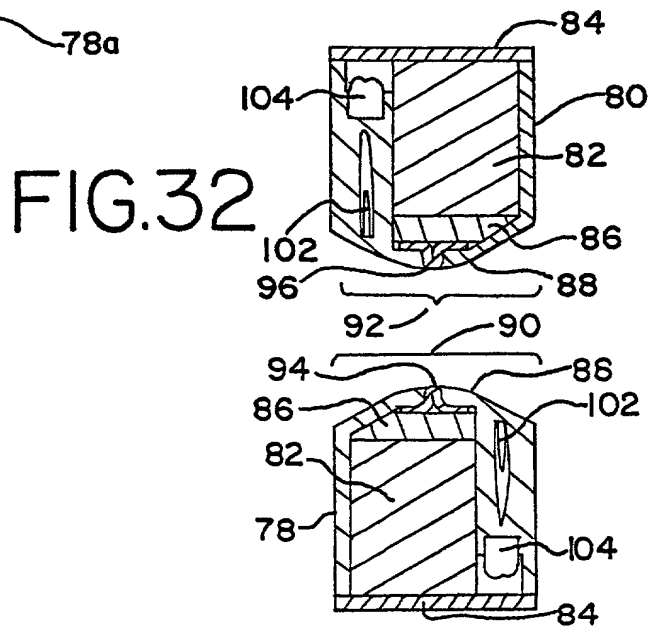
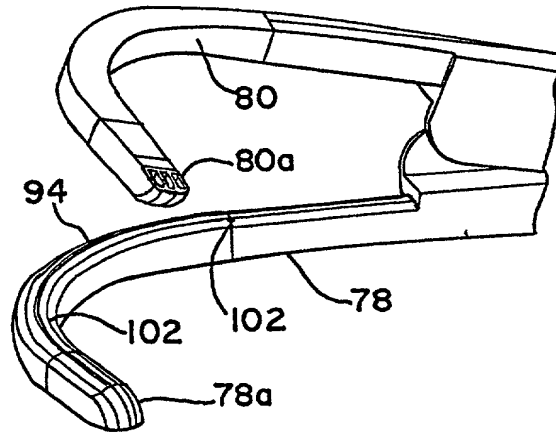
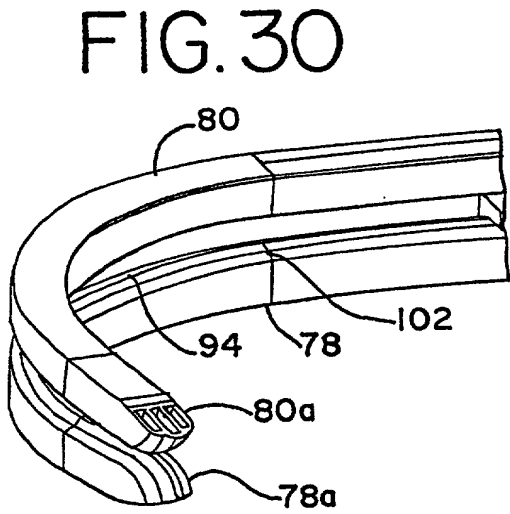
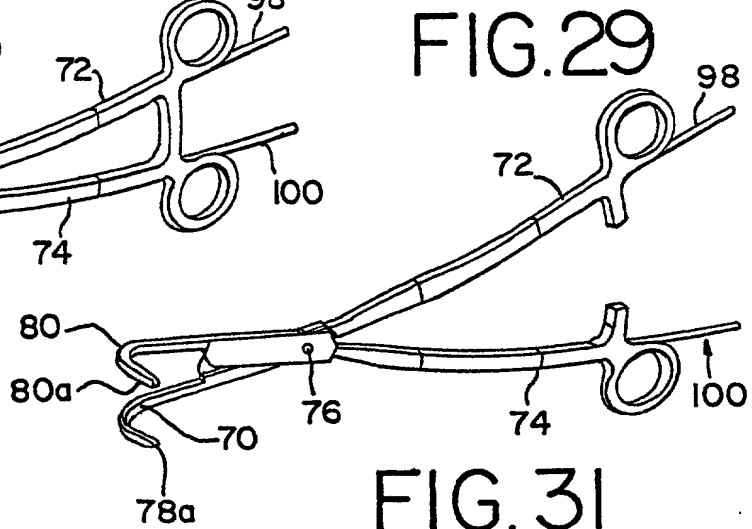
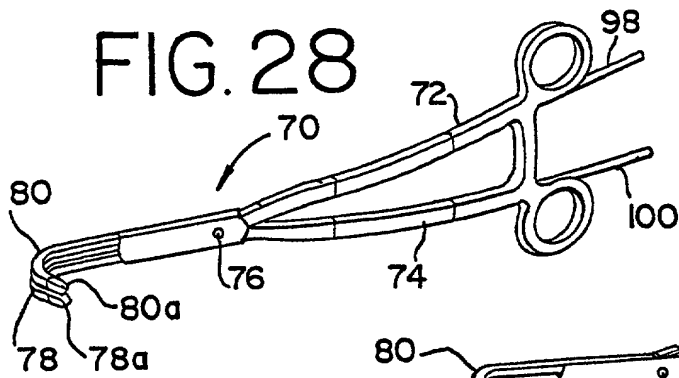


FIG. 28 is a perspective view of the surgical instrument in a first configuration. FIG. 29 is a perspective view of the surgical instrument in a second configuration. FIG. 30 is a perspective view of the handle and proximal part of the shaft of the instrument. FIG. 31 is a perspective view of the handle and proximal part of the shaft of the instrument. FIG. 32 is a cross-sectional view of the handle and proximal part of the shaft of the instrument.

# FIG. 33

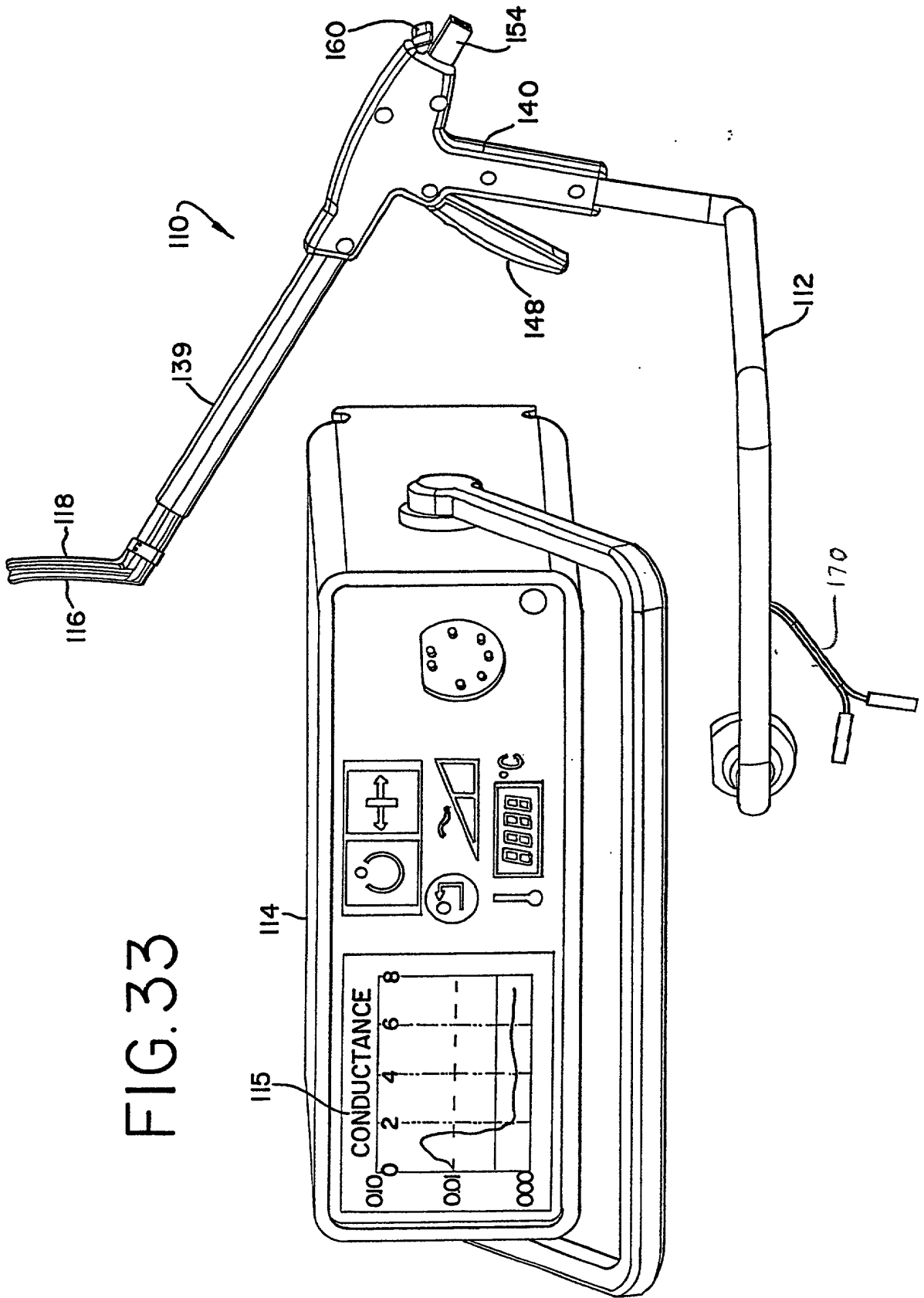
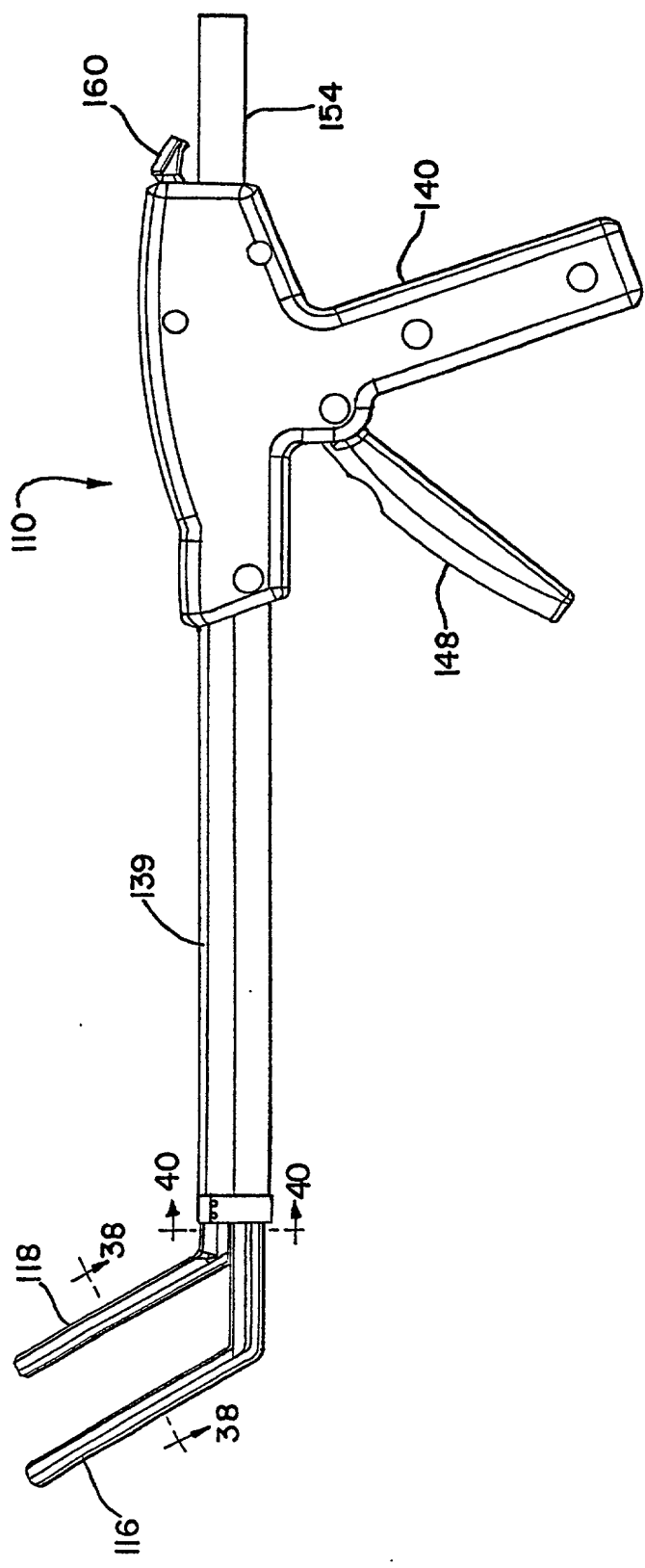




FIG. 34



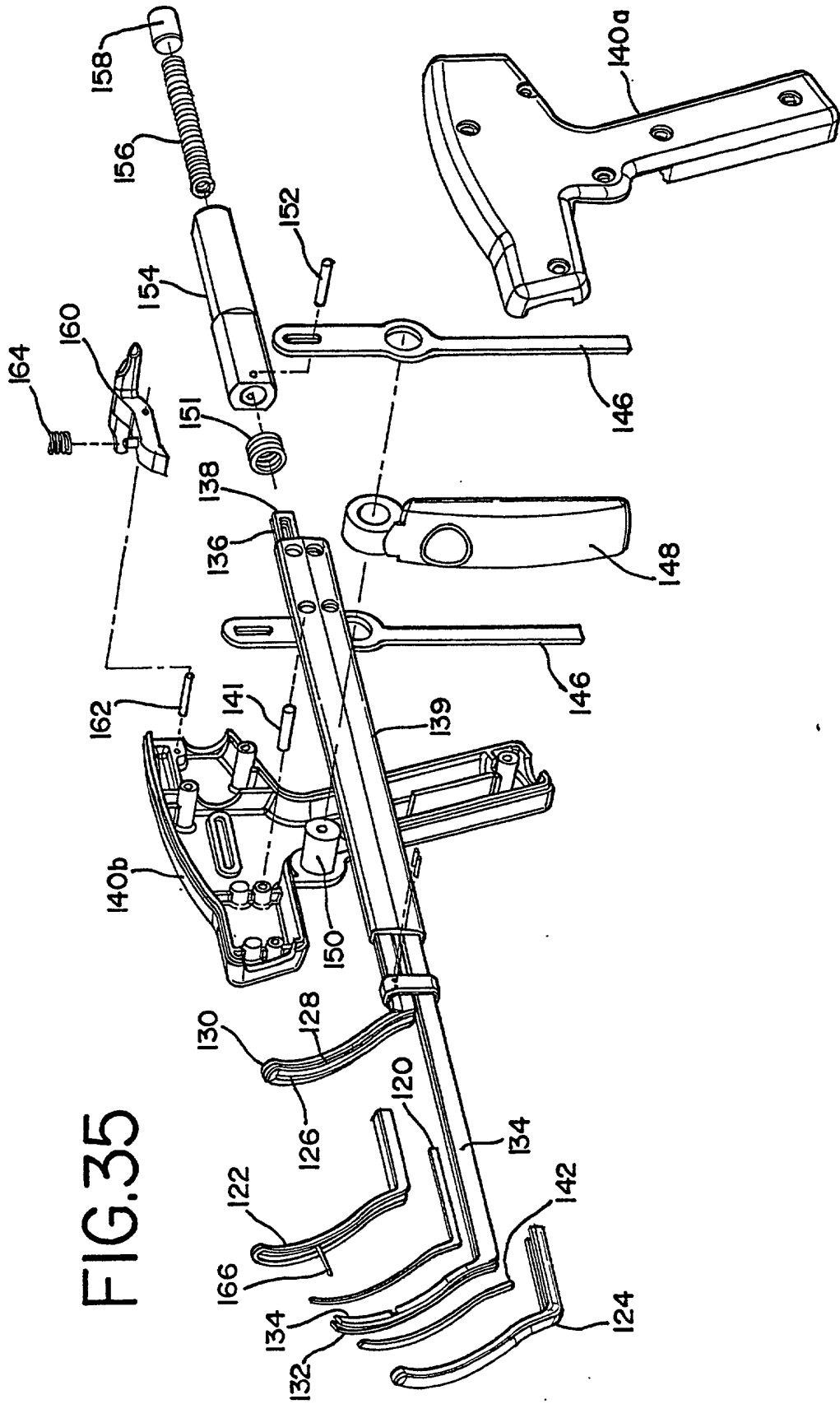


FIG. 35

THIS PATENT IS A DIVISION OF U.S. PATENT NO. 3,800,000, ISSUED IN 1972, AND IS RELATED TO U.S. PATENT NO. 3,800,000, ISSUED IN 1972, AND IS RELATED TO U.S. PATENT NO. 3,800,000, ISSUED IN 1972.

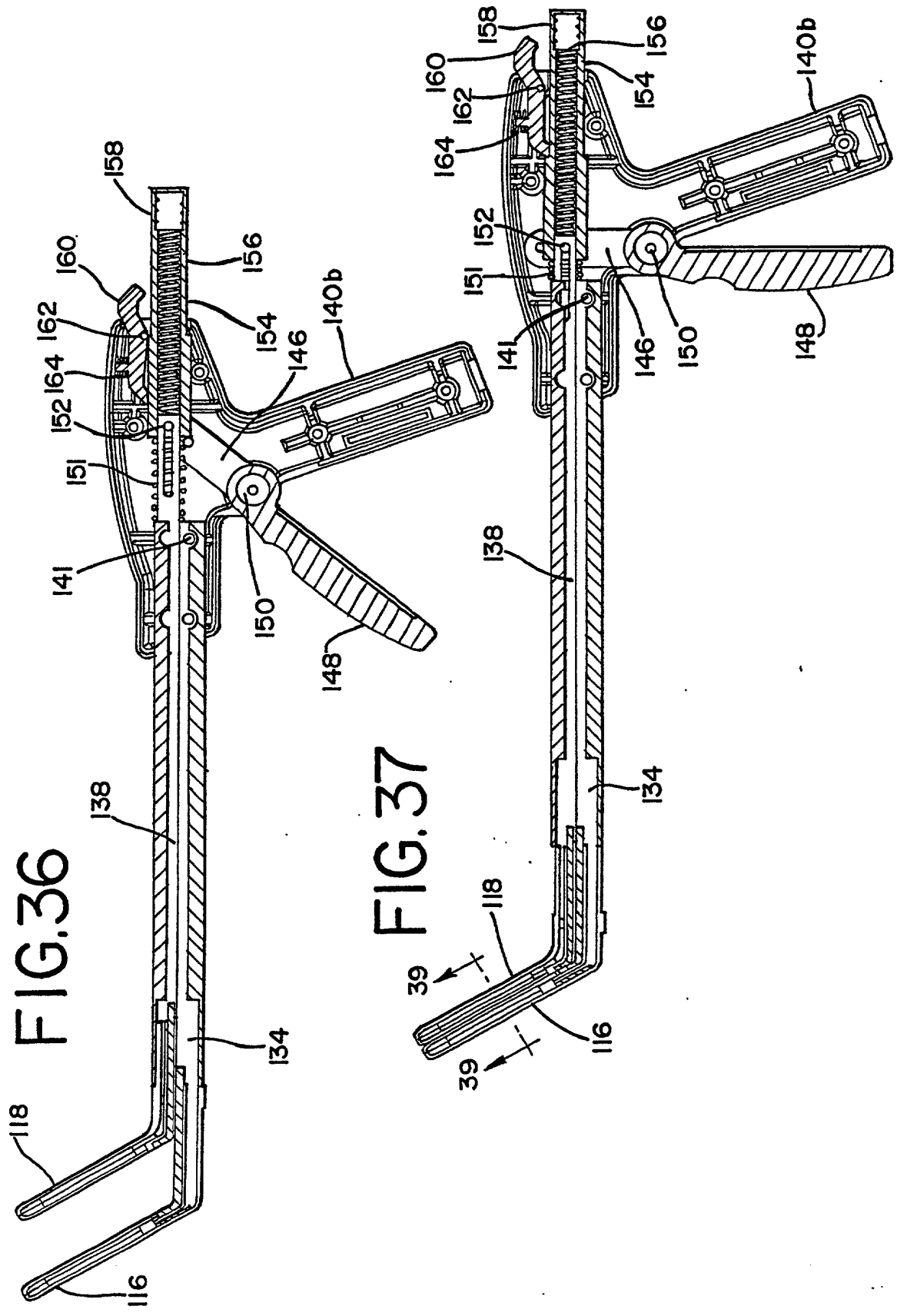
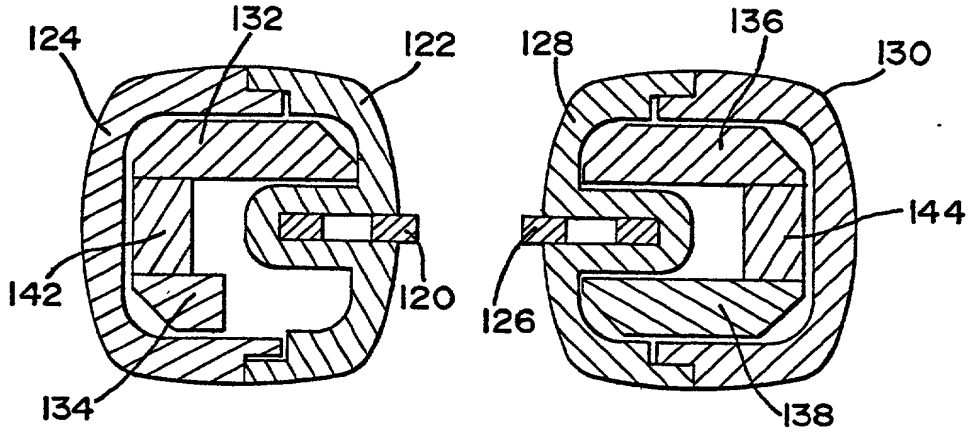


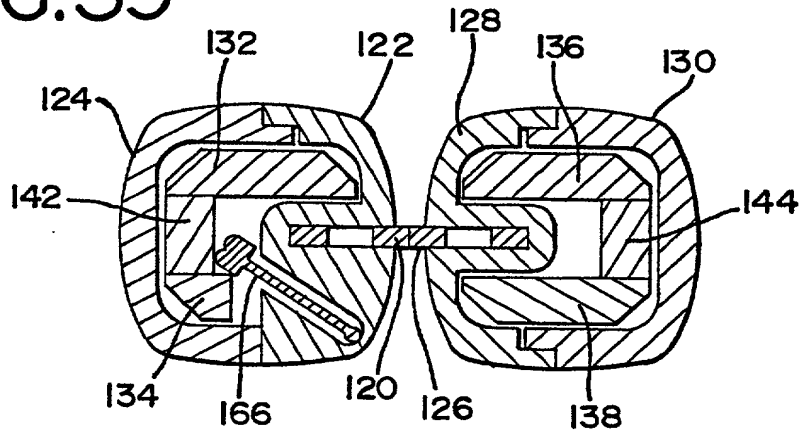
FIG. 36

FIG. 37

# FIG.38



# FIG.39



# FIG.40

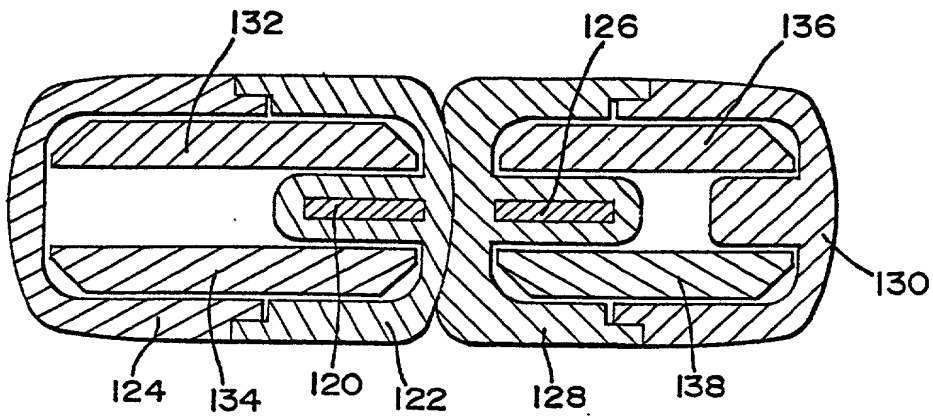


FIG.41

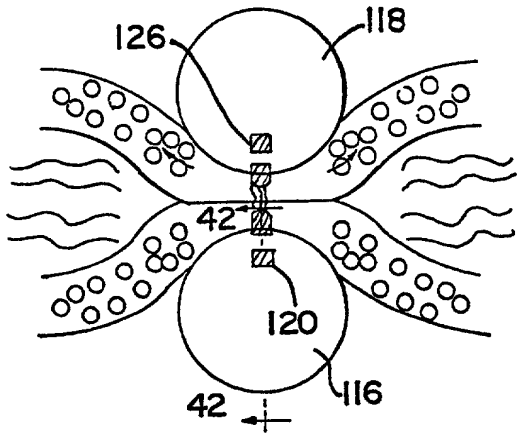


FIG.42

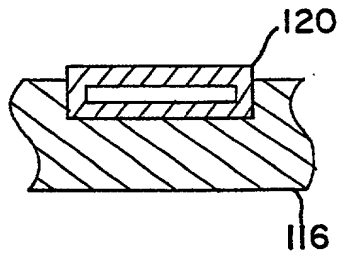


FIG.43

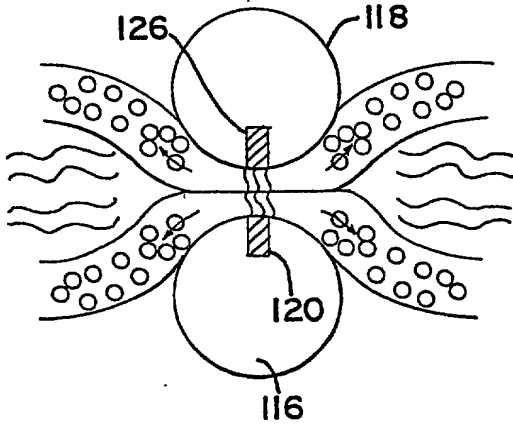


FIG.44

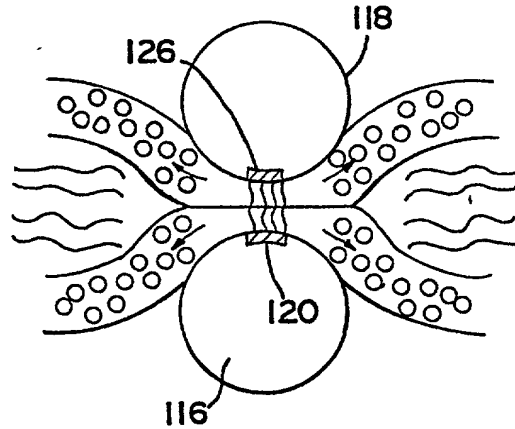


FIG.45

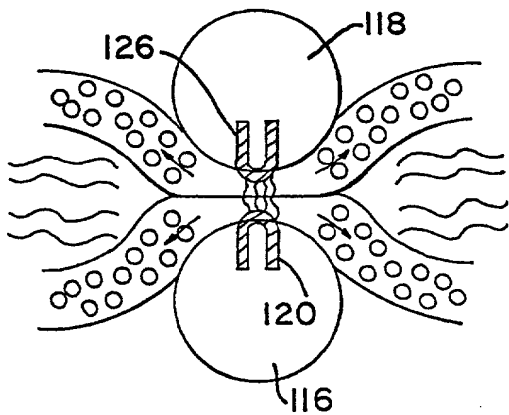


FIG.46

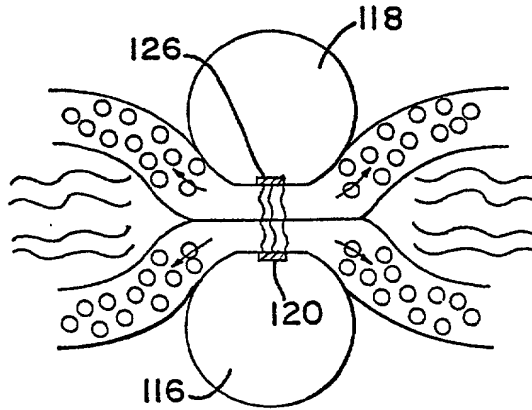


FIG.47

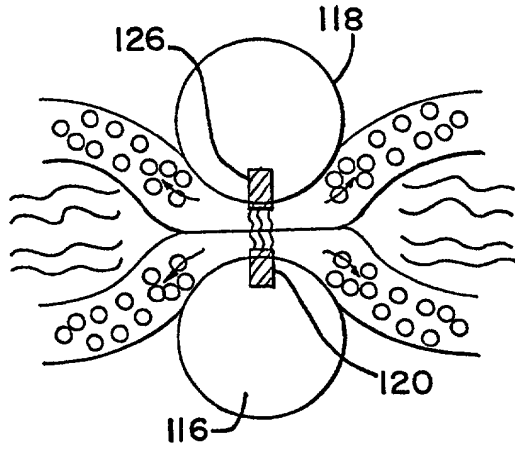


FIG.48

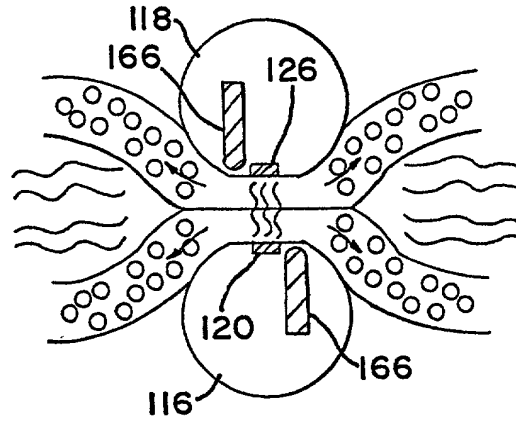


FIG.49

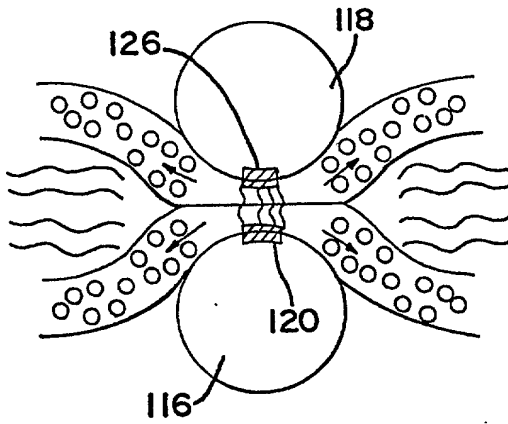


FIG.50

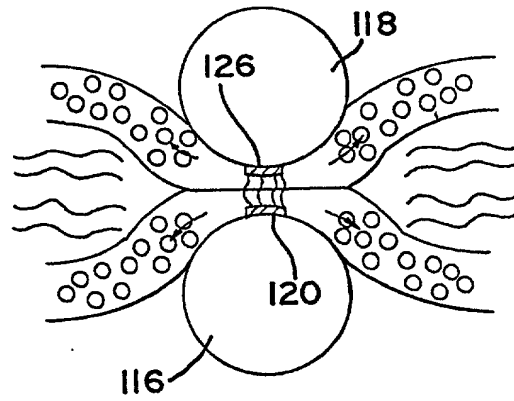
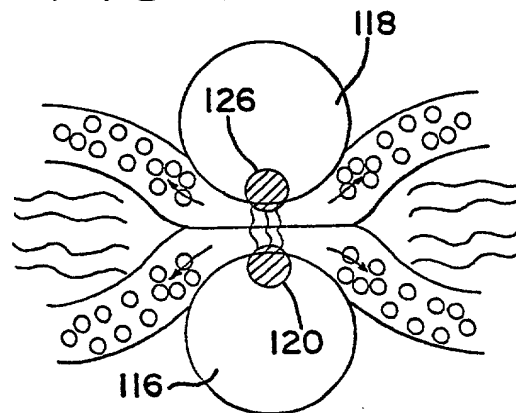
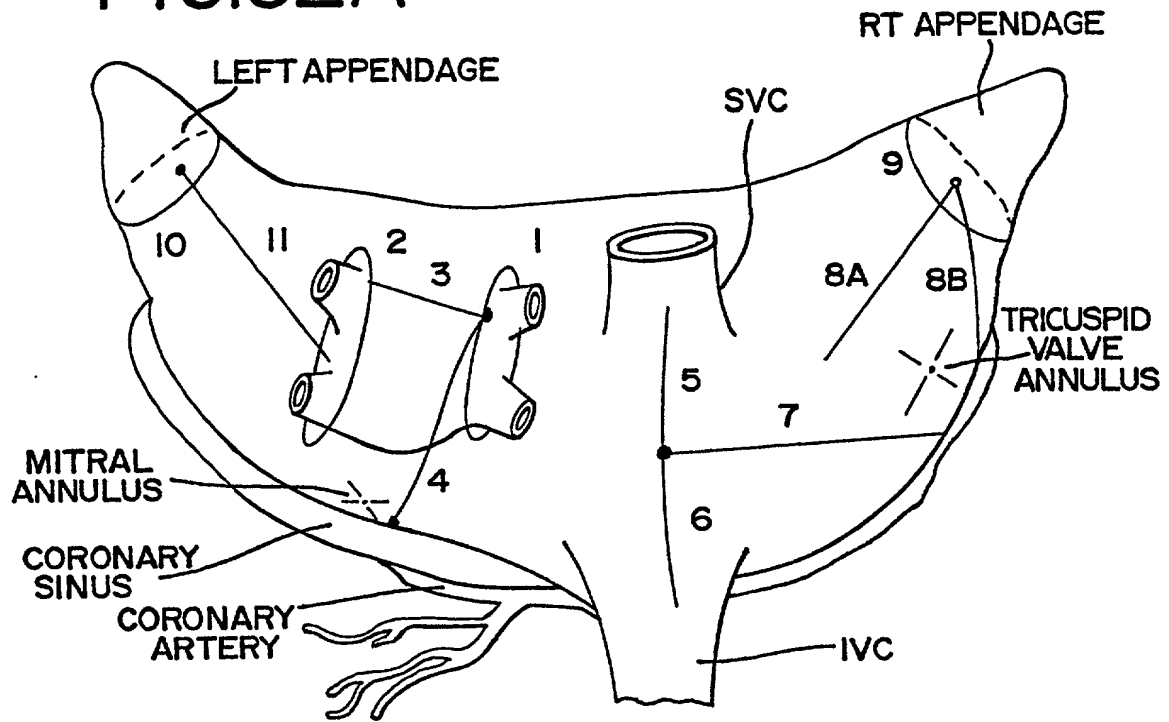


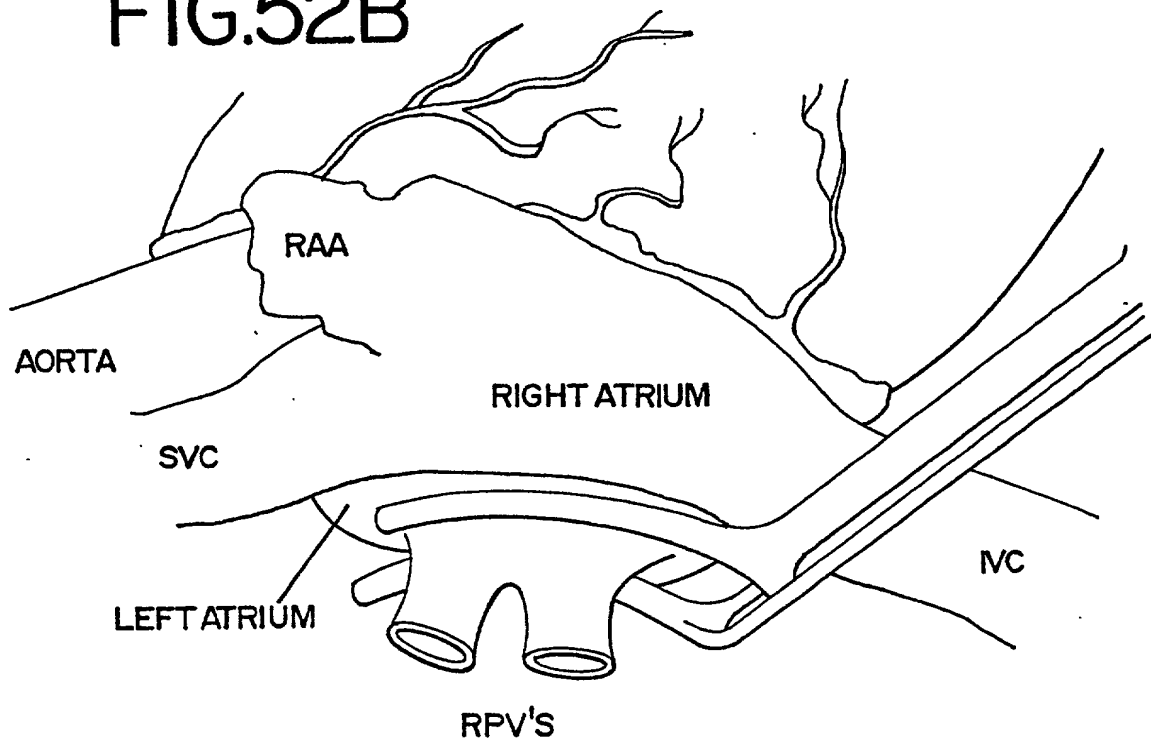
FIG.51



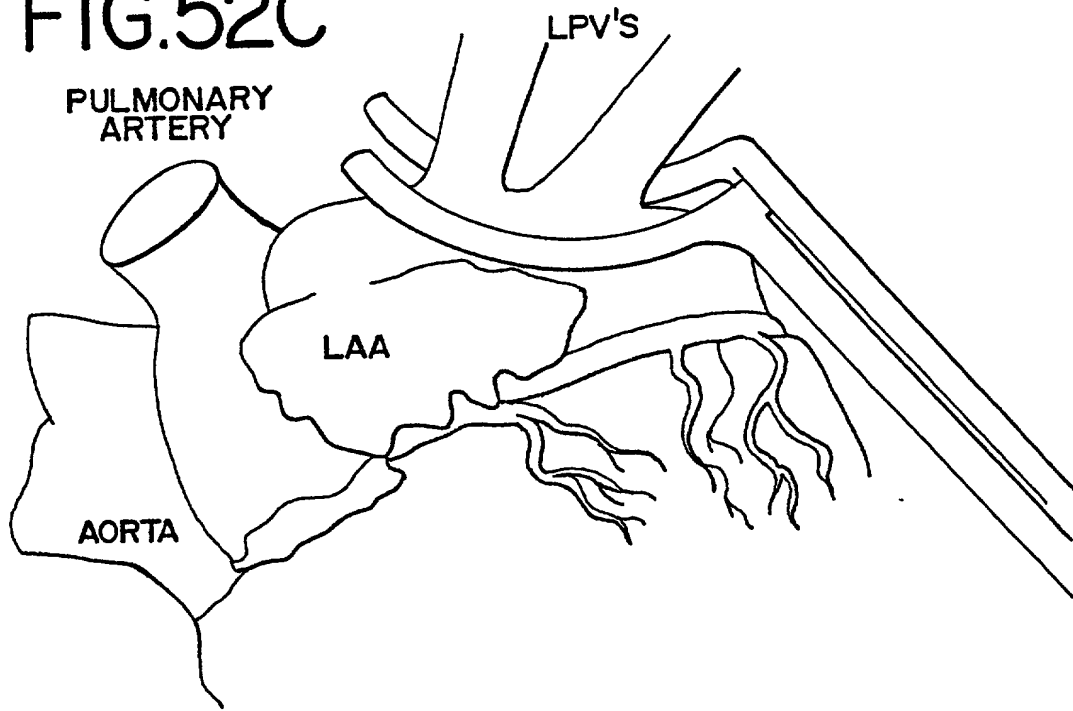
# FIG.52A



# FIG.52B



**FIG.52C**



**FIG.52D** HEART LIFTED

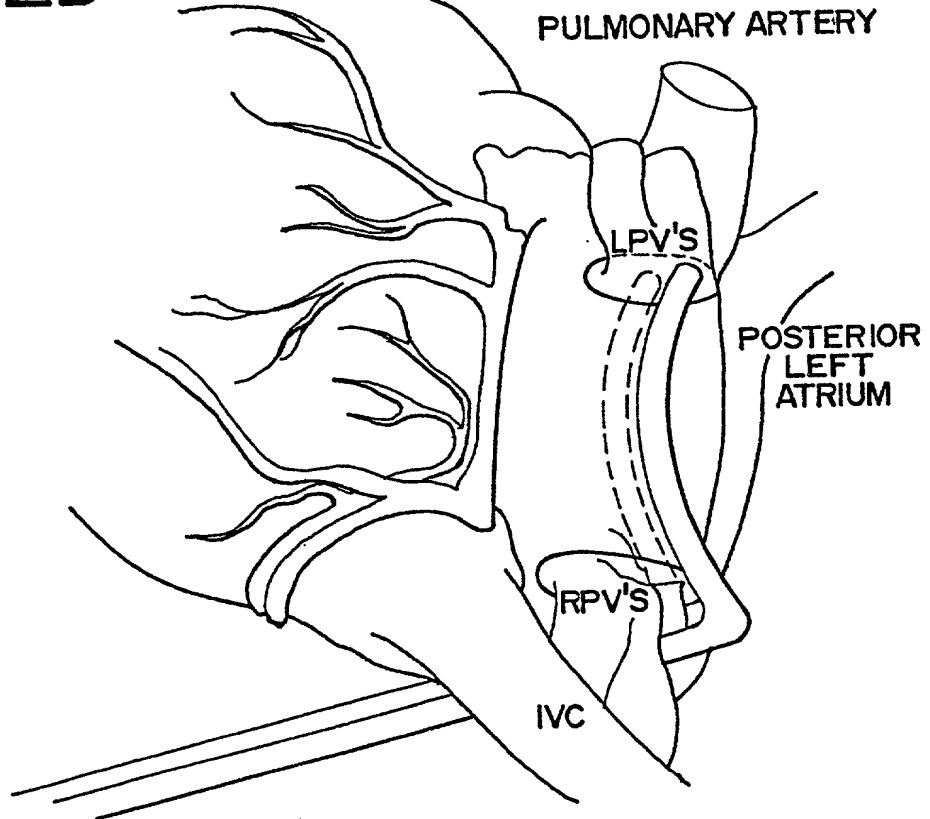


FIG. 52C



FIG.52E

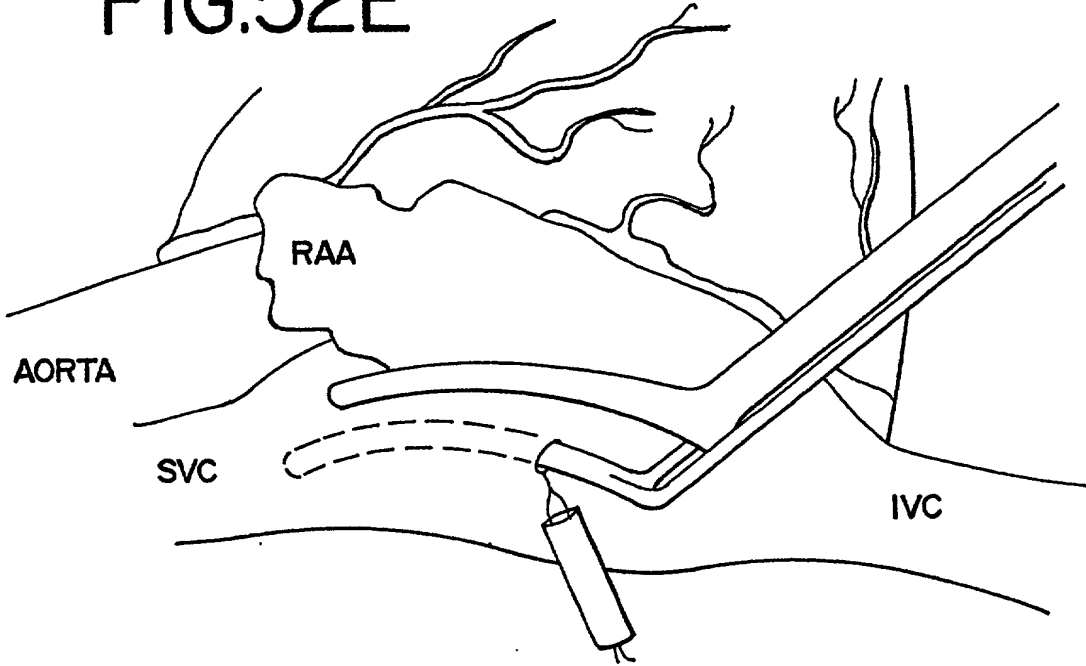


FIG.52F

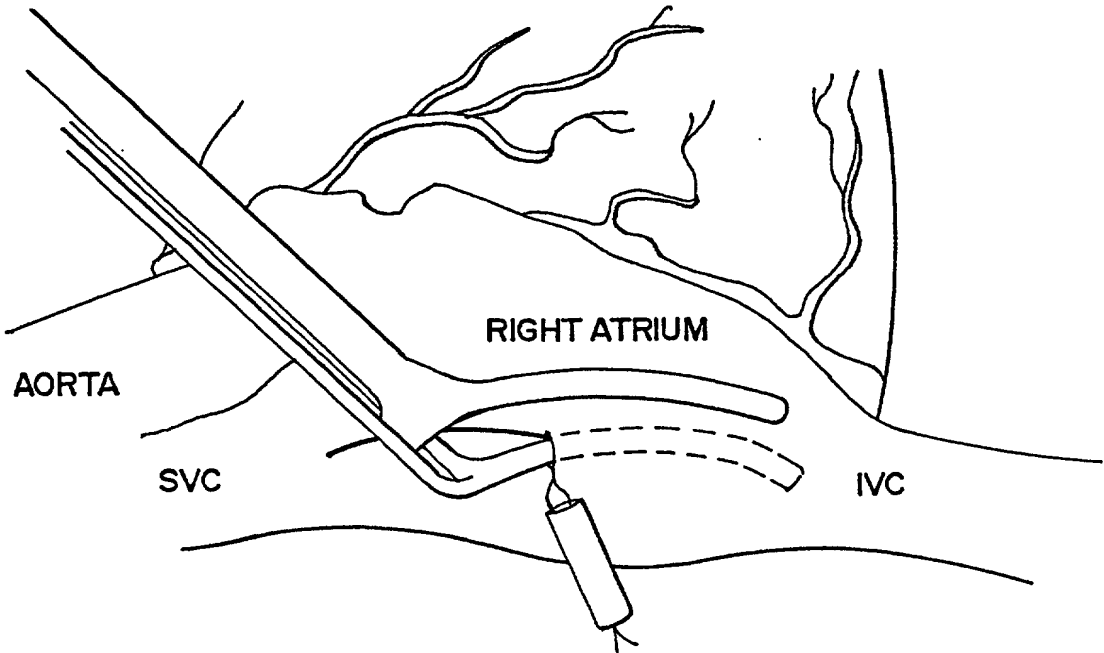


FIG. 52E



FIG.52I

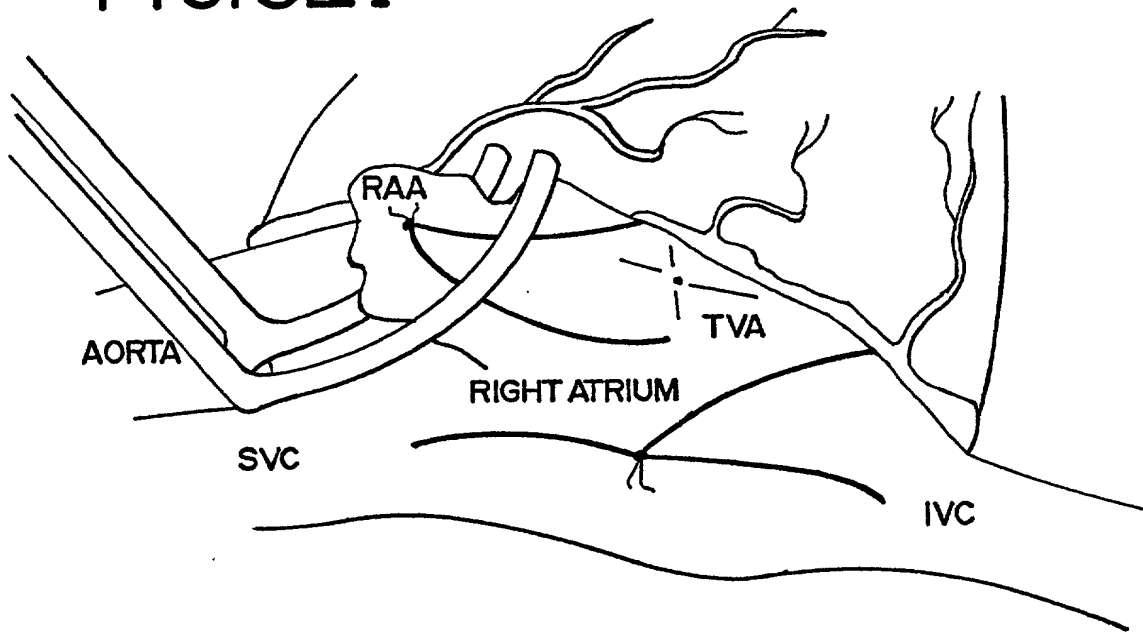


FIG.52J

PULMONARY ARTERY

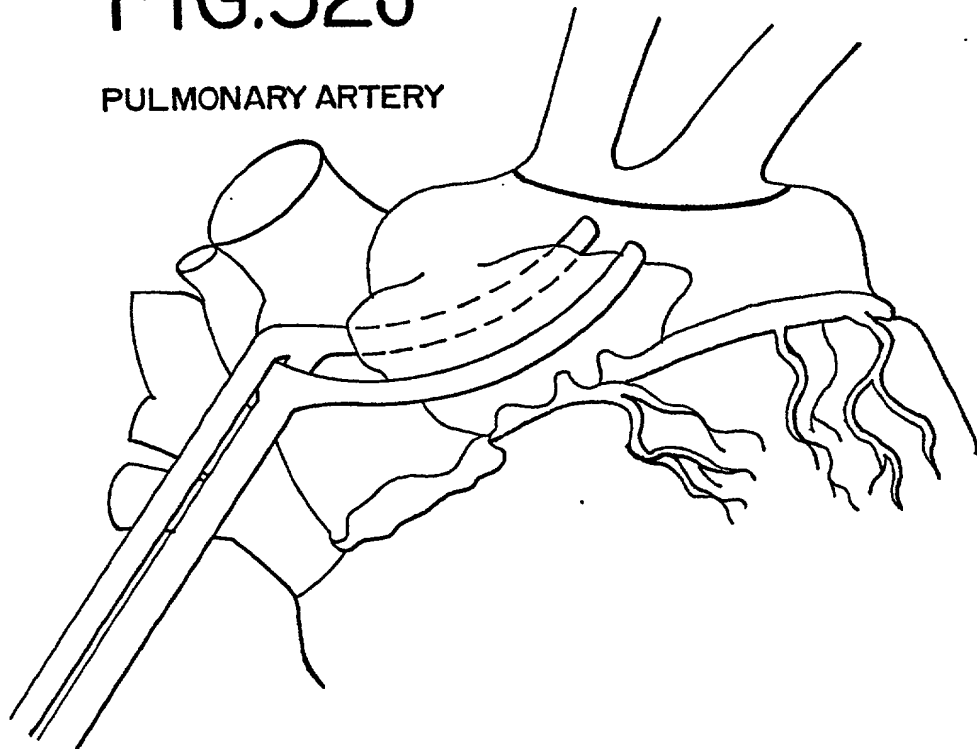


FIG. 52I and FIG. 52J are schematic diagrams of the heart and pulmonary artery system. FIG. 52I shows the right atrium, tricuspid valve, and major veins. FIG. 52J shows the pulmonary artery and its branches.

# FIG.52K

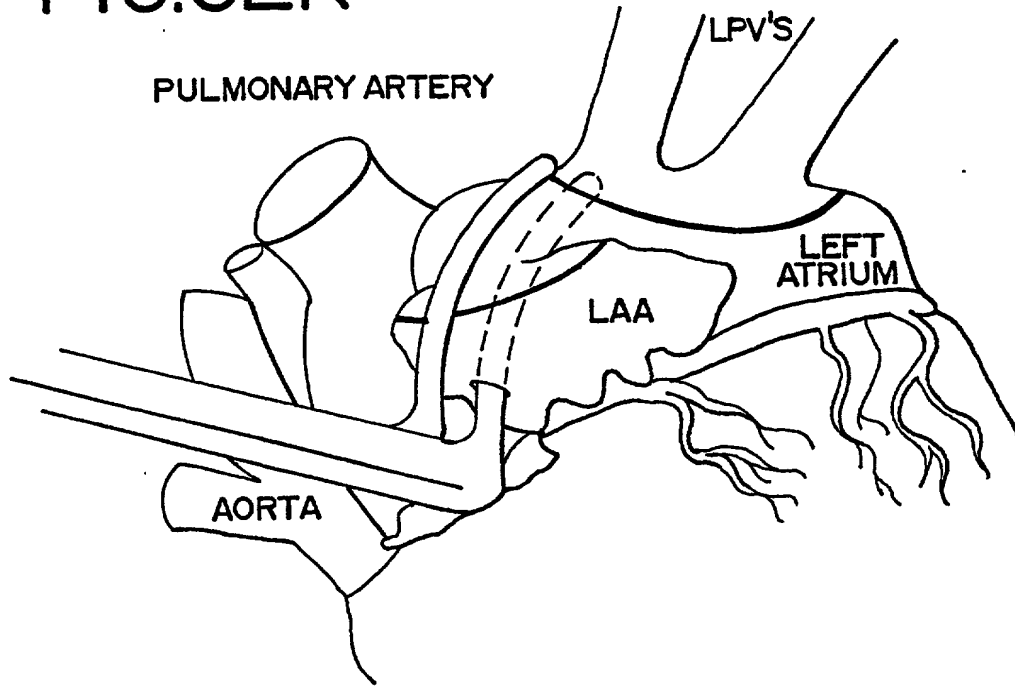


FIG. 52K is a schematic diagram of the heart and major vessels, showing the pulmonary artery, left atrium, left atrial appendage (LAA), and aorta. The diagram illustrates the anatomical relationships between these structures, with the pulmonary artery and aorta shown in cross-section and the left atrium and LAA shown in outline. The LPV'S (left pulmonary vein) is also indicated.

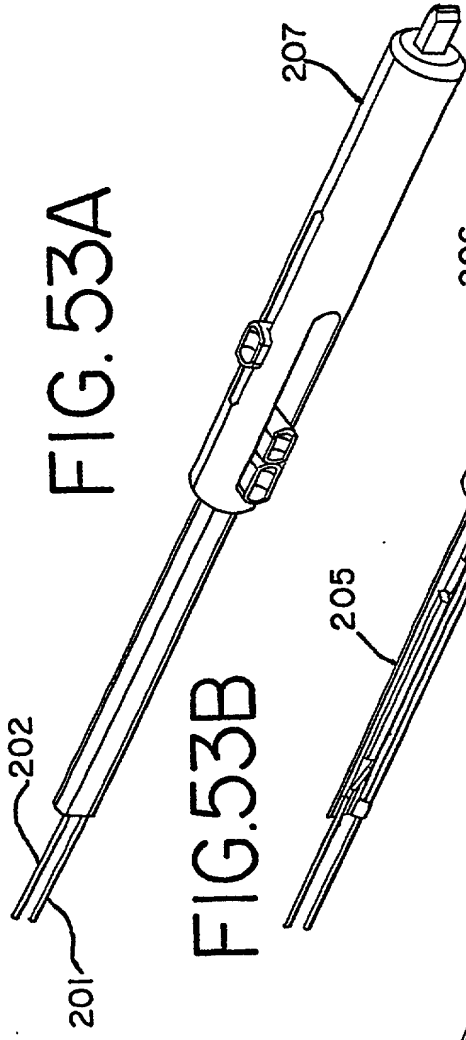


FIG. 53A

FIG. 53B

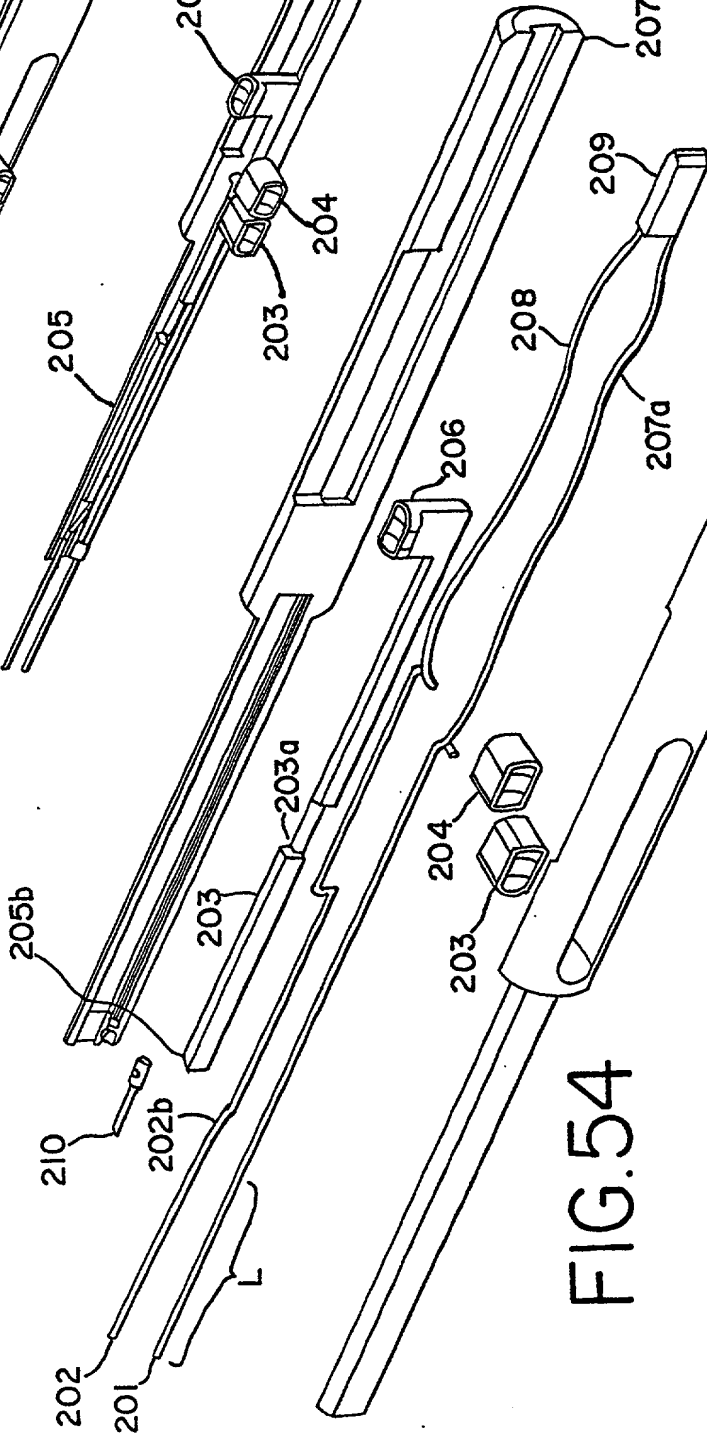
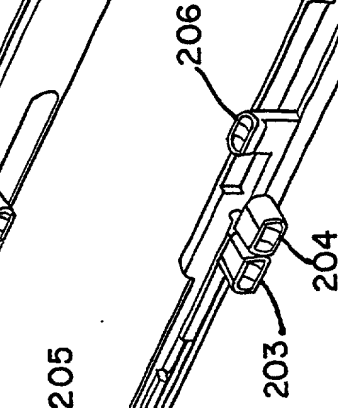
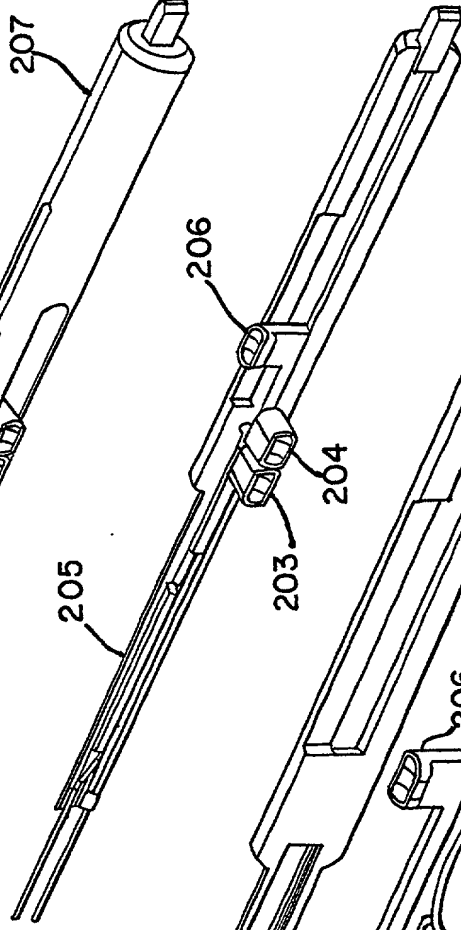


FIG. 54

FIG. 55

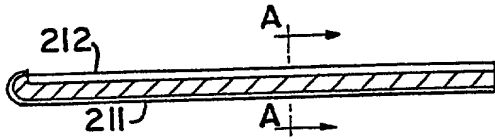


FIG. 56

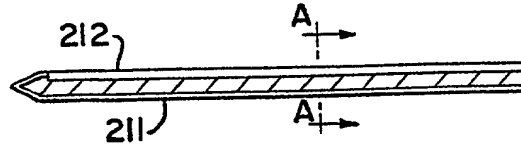


FIG. 57

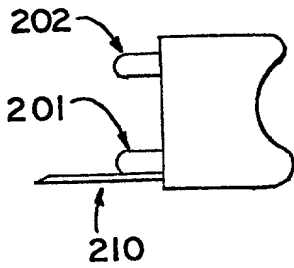


FIG. 58A

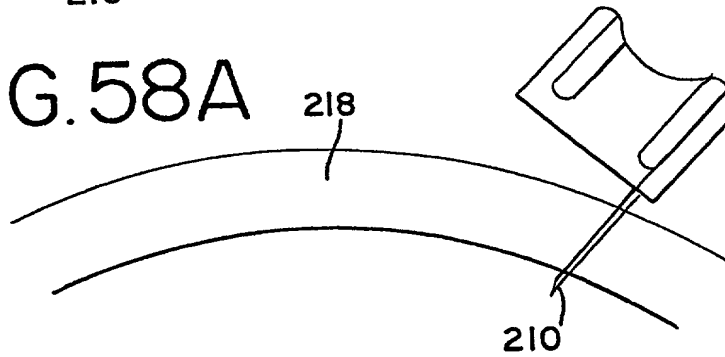


FIG. 58B

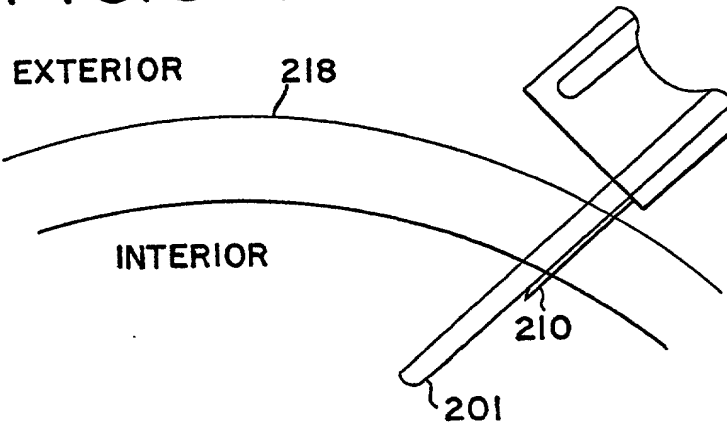


FIG. 55

FIG. 58C

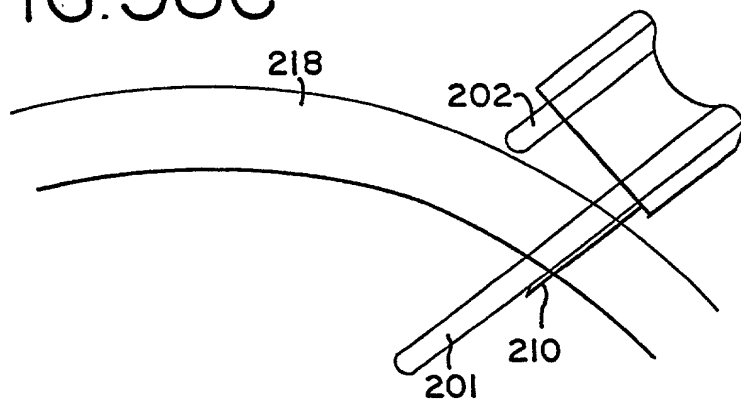


FIG. 58D

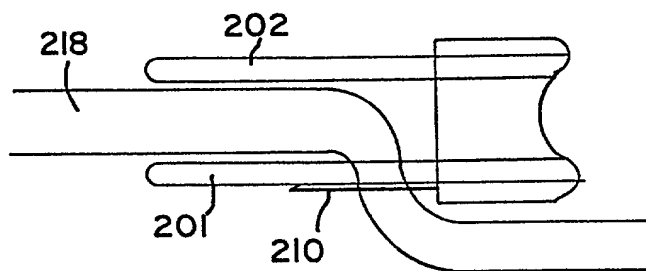


FIG. 58E

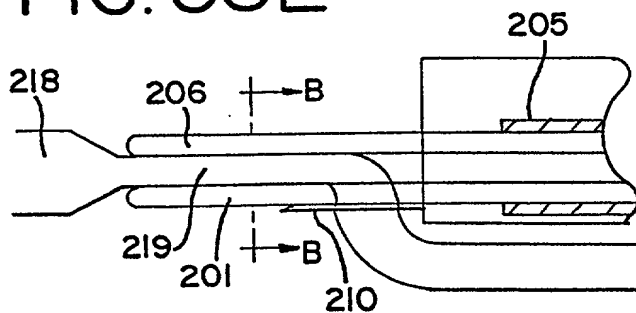


FIG. 58F

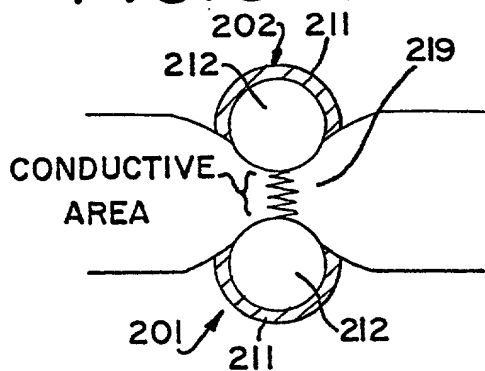


FIG. 58G

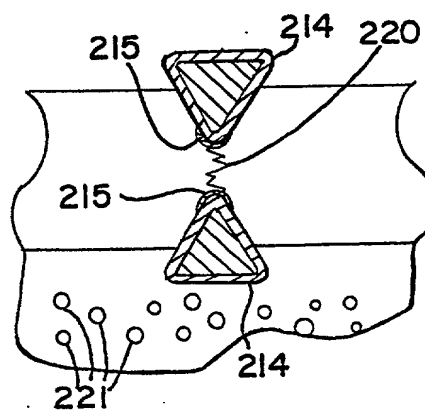


FIG. 59

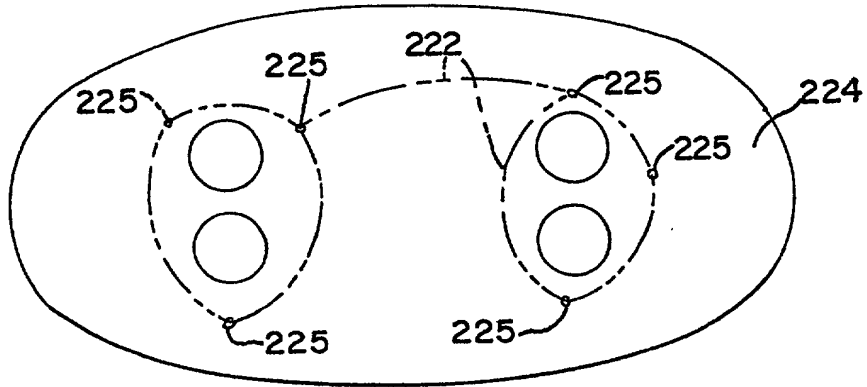


FIG. 60A

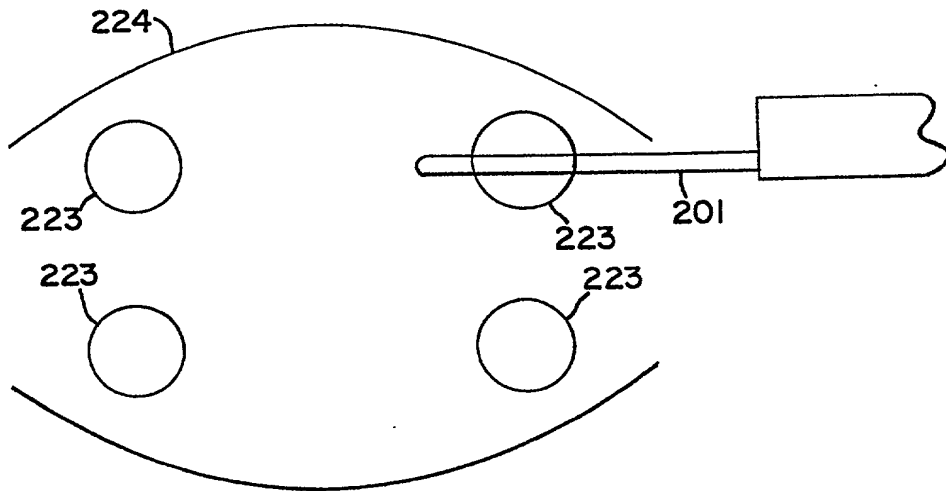


FIG. 59



FIG. 60B

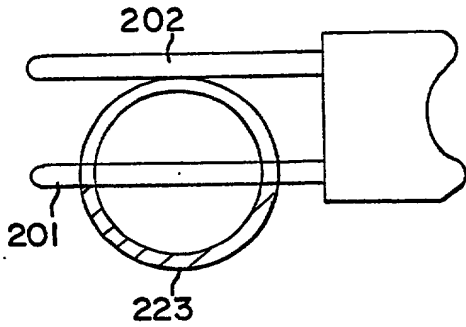


FIG. 60C

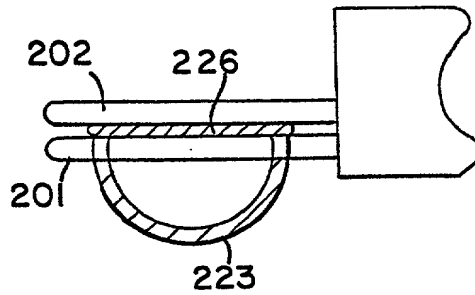


FIG. 60D

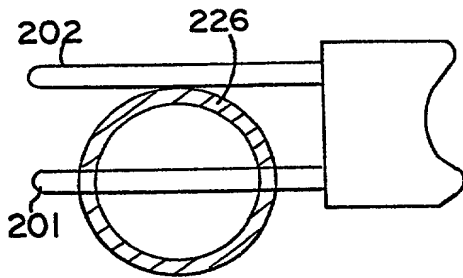


FIG. 60E

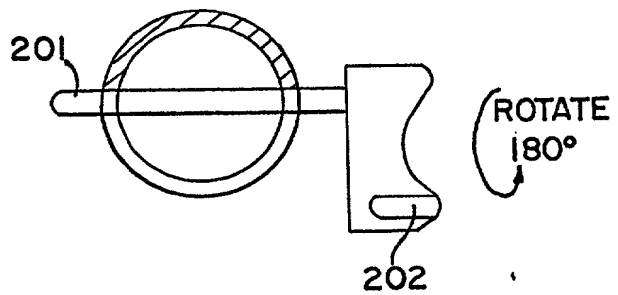


FIG. 60F

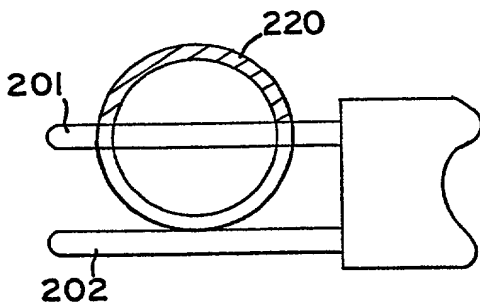


FIG. 60G

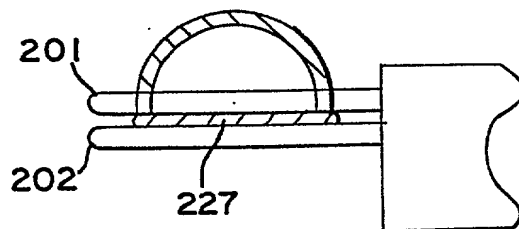


FIG. 60H

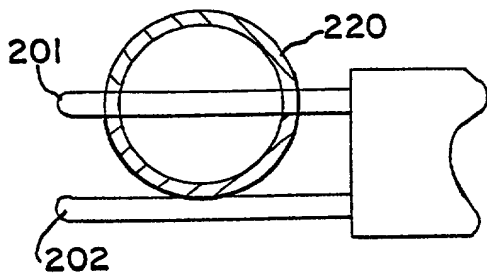
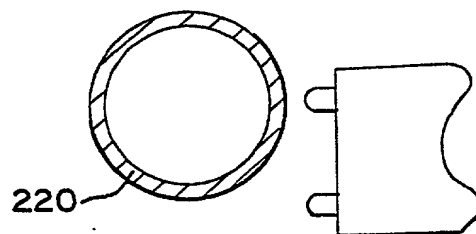


FIG. 60I



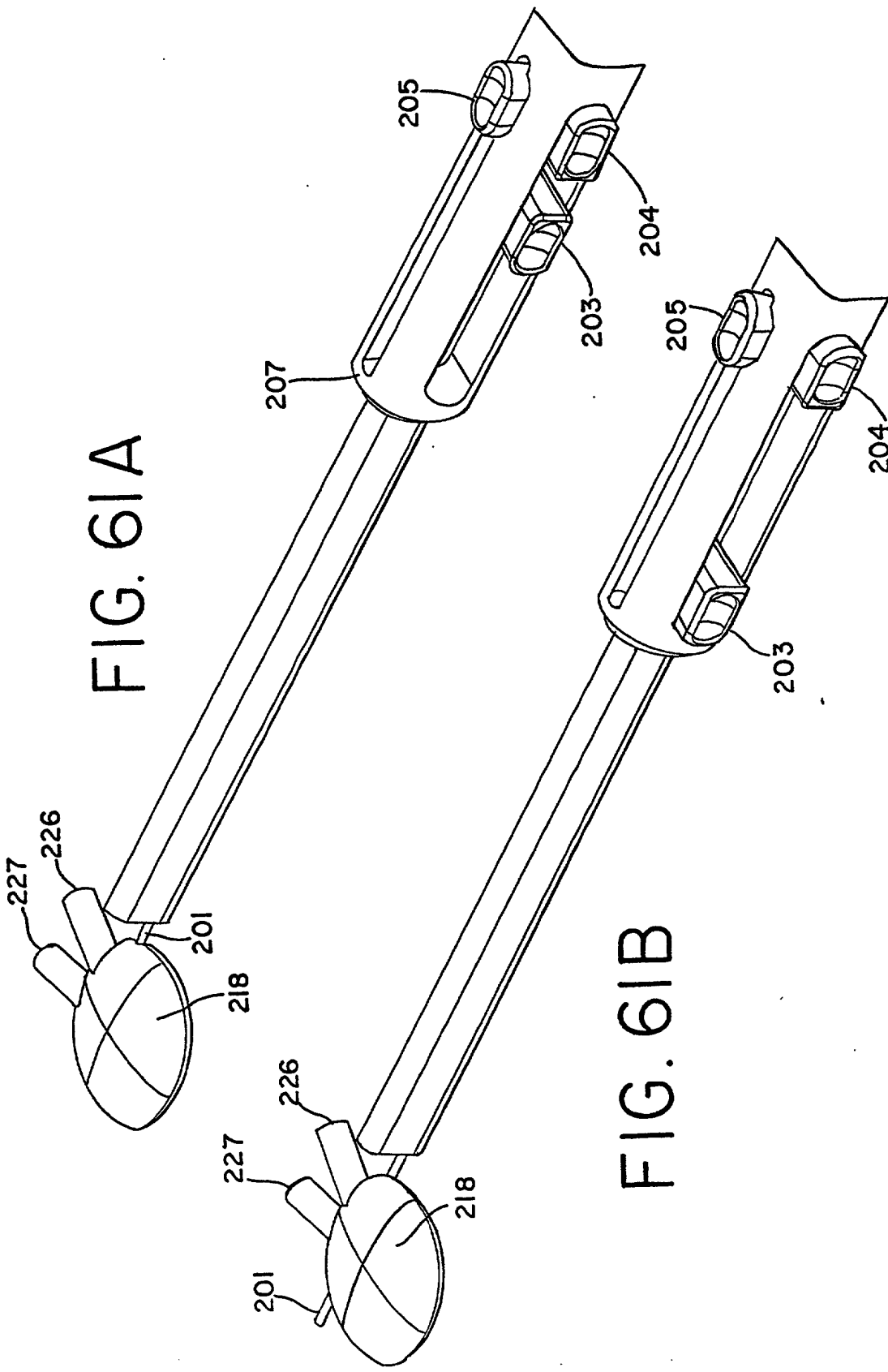


FIG. 6A

FIG. 6B

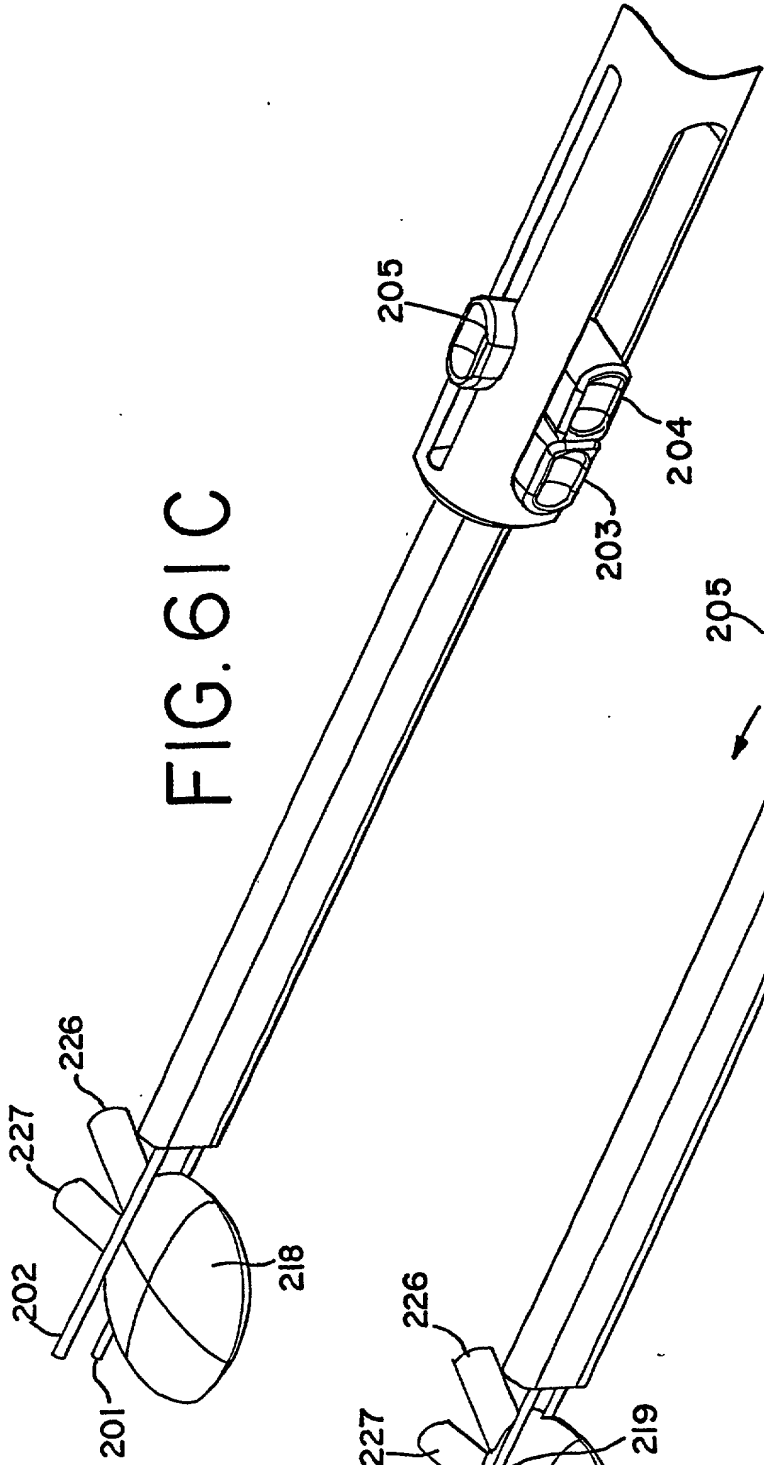
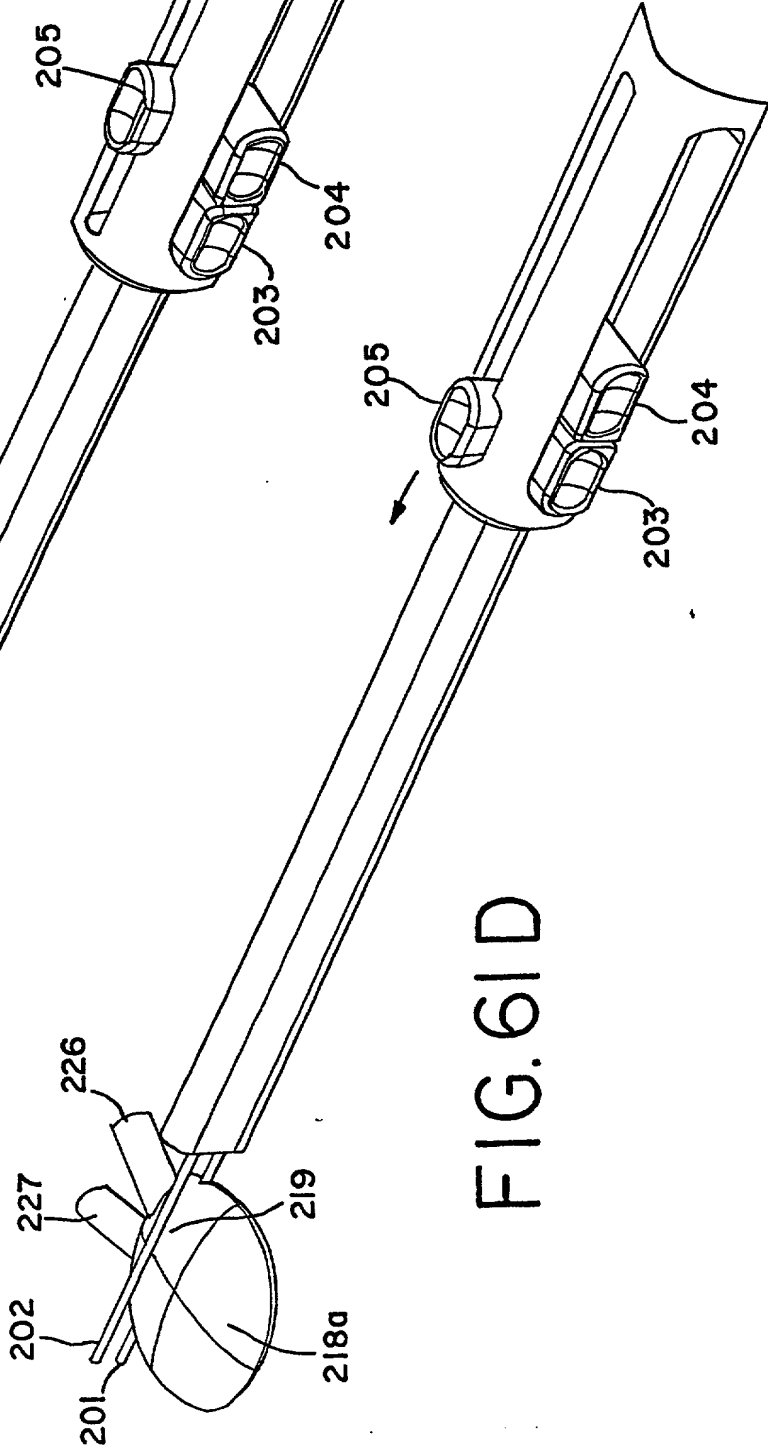


FIG. 61D



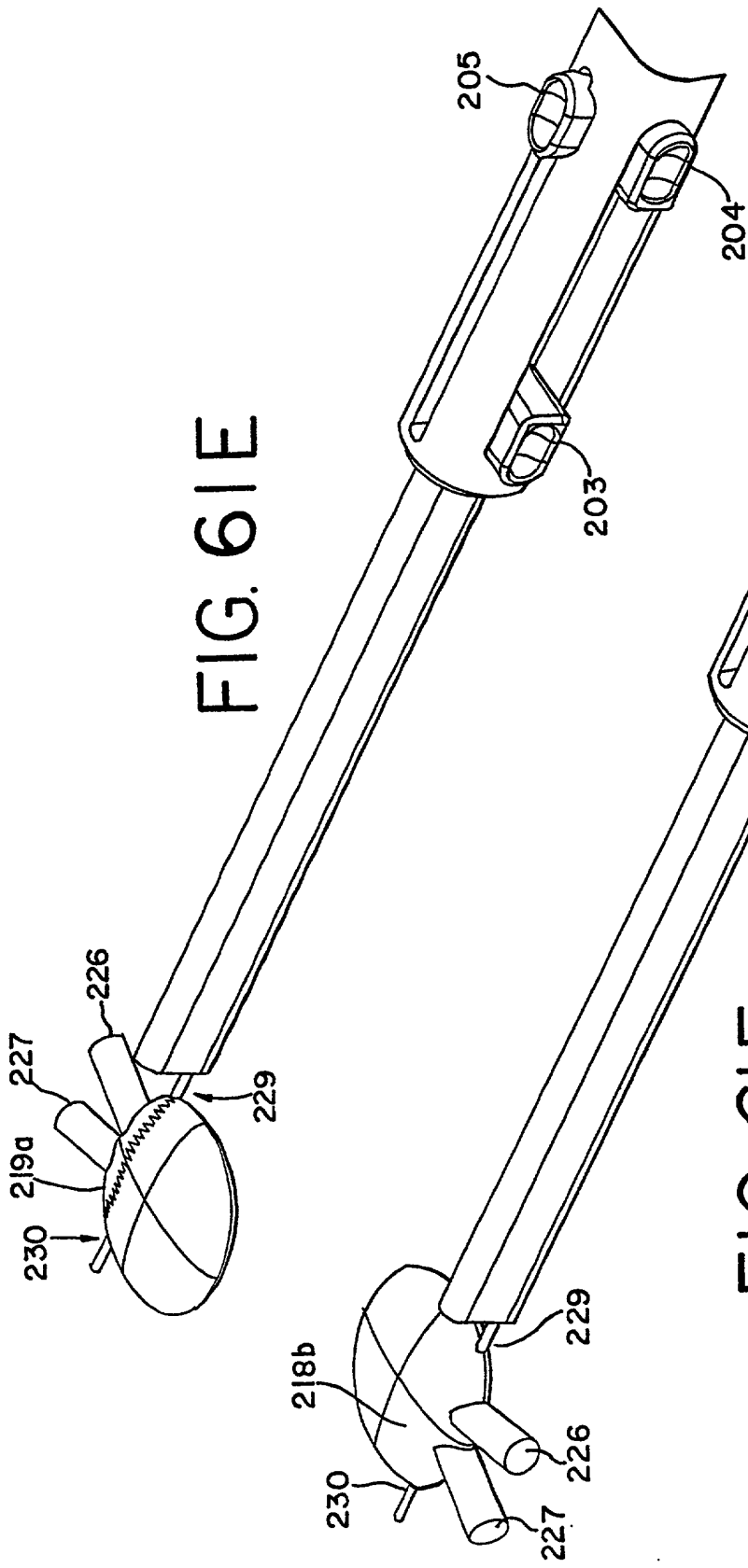
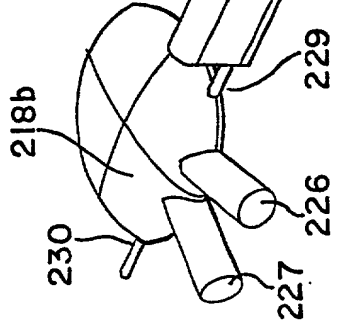
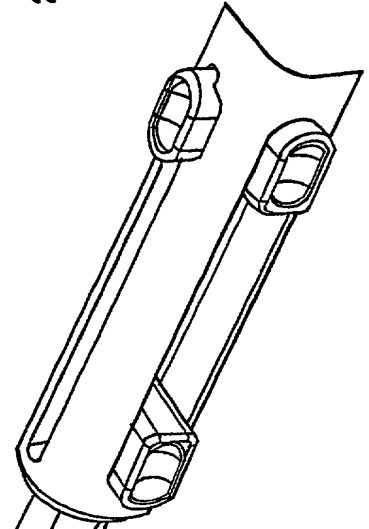


FIG. 61E

FIG. 61F



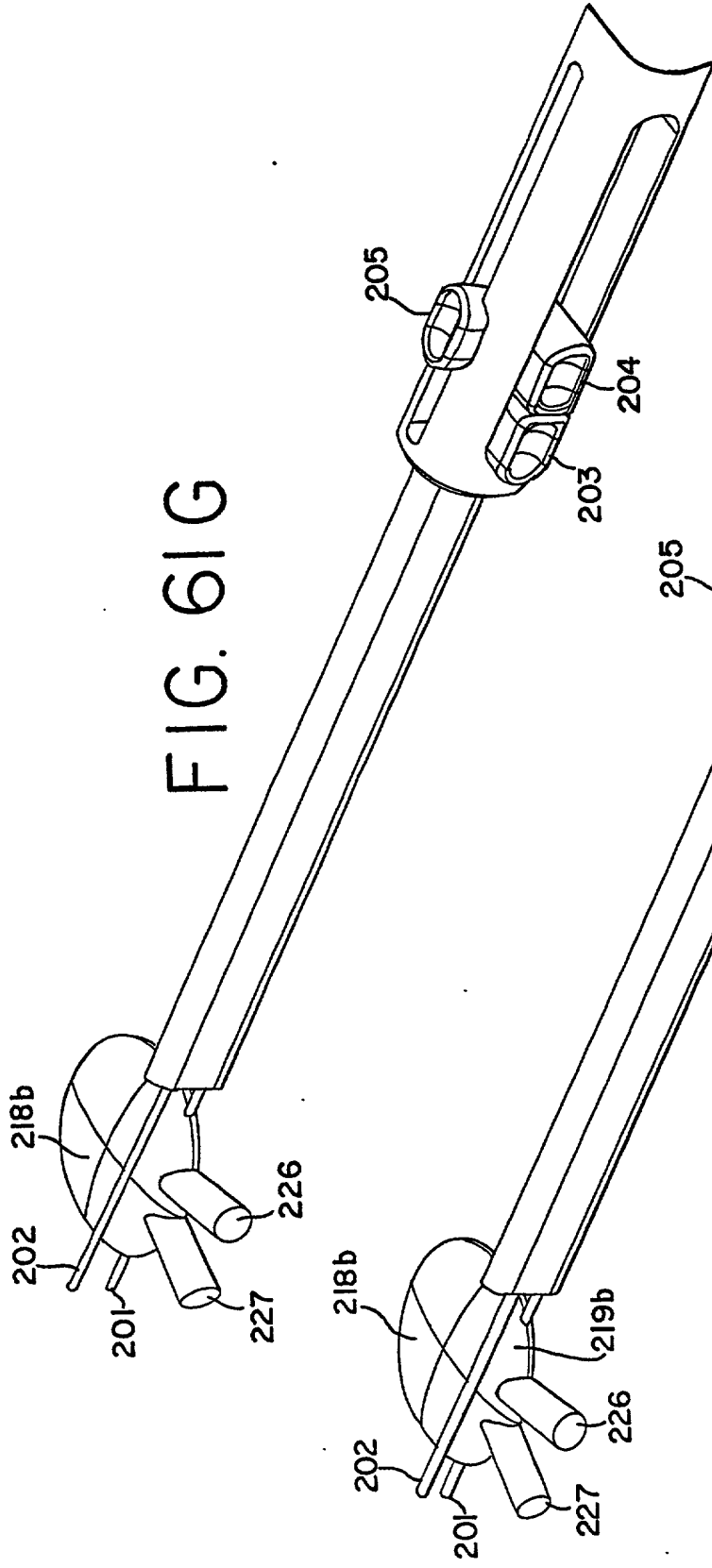
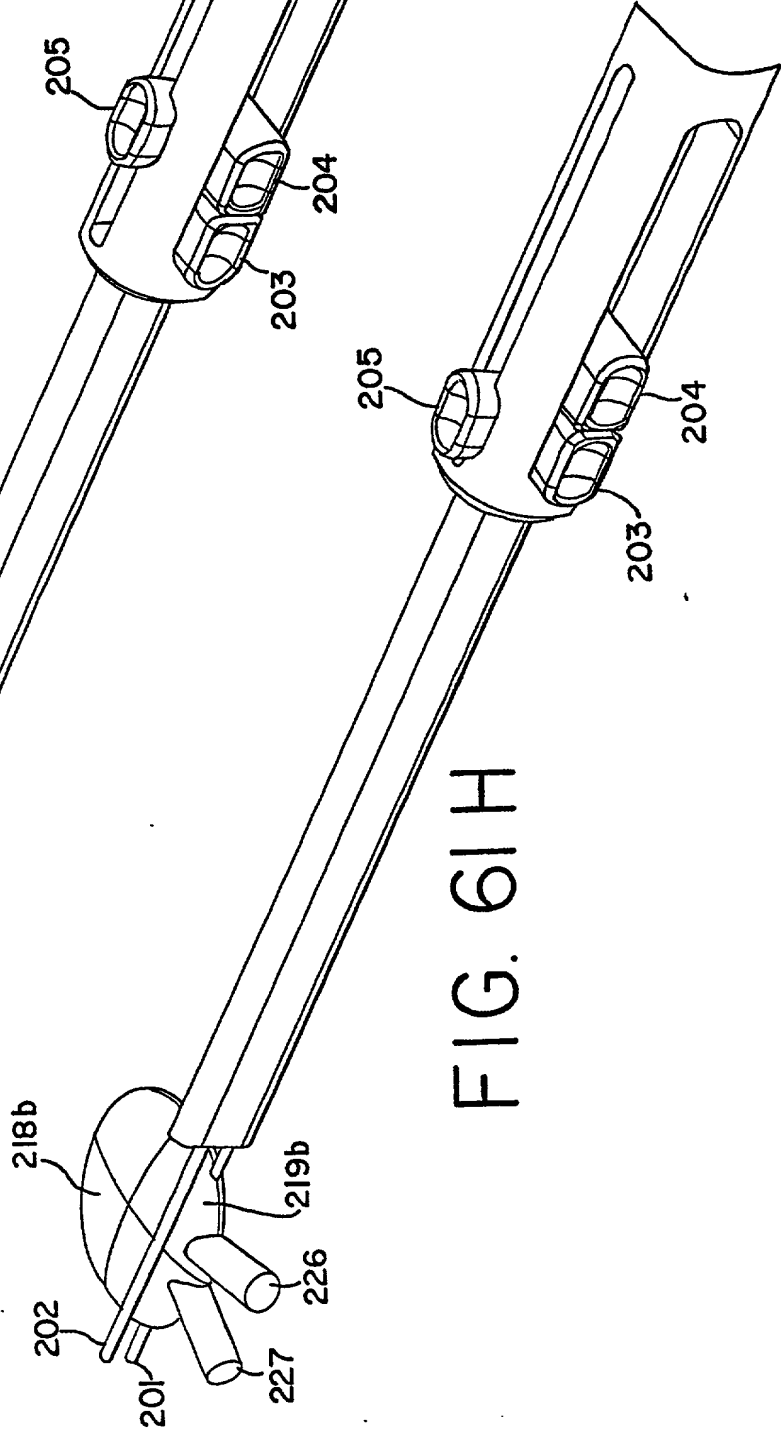


FIG. 61H



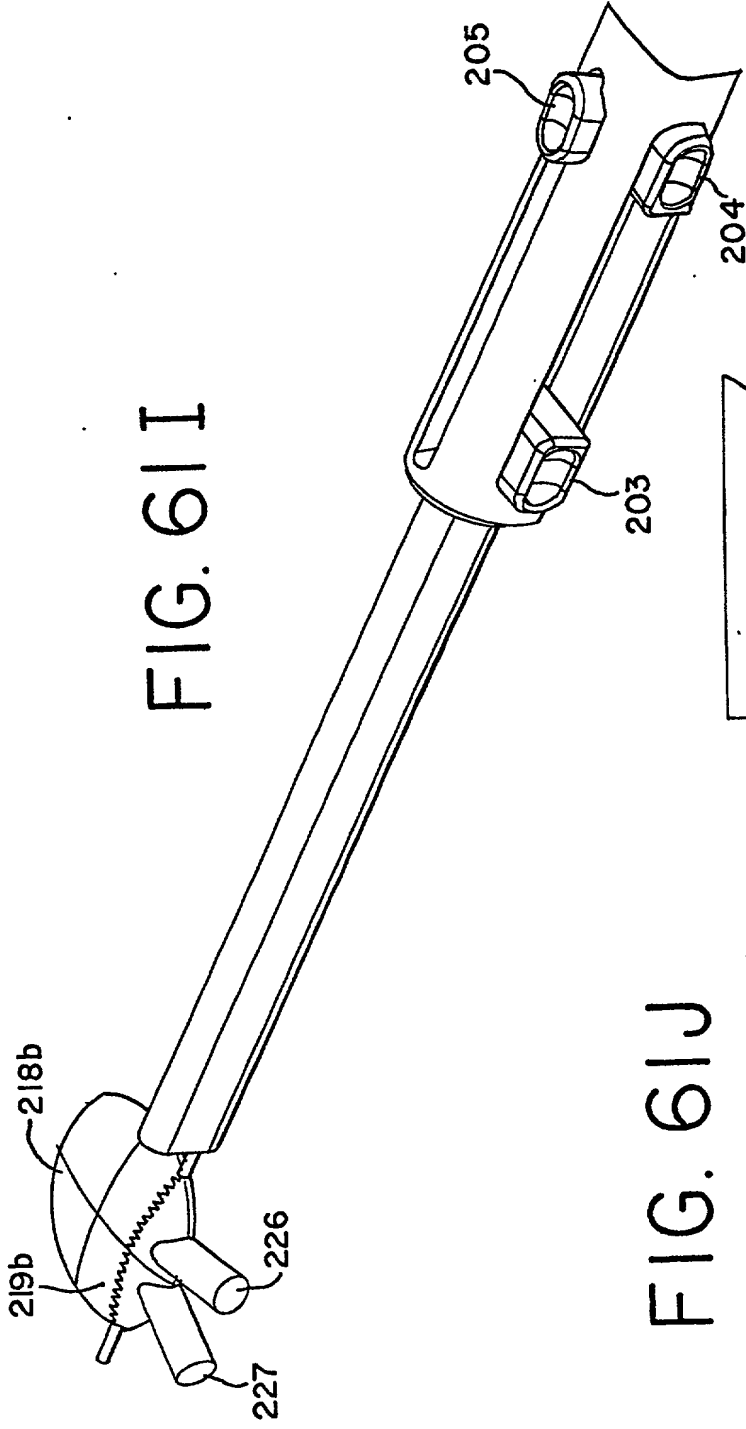


FIG. 6II

FIG. 6IJ

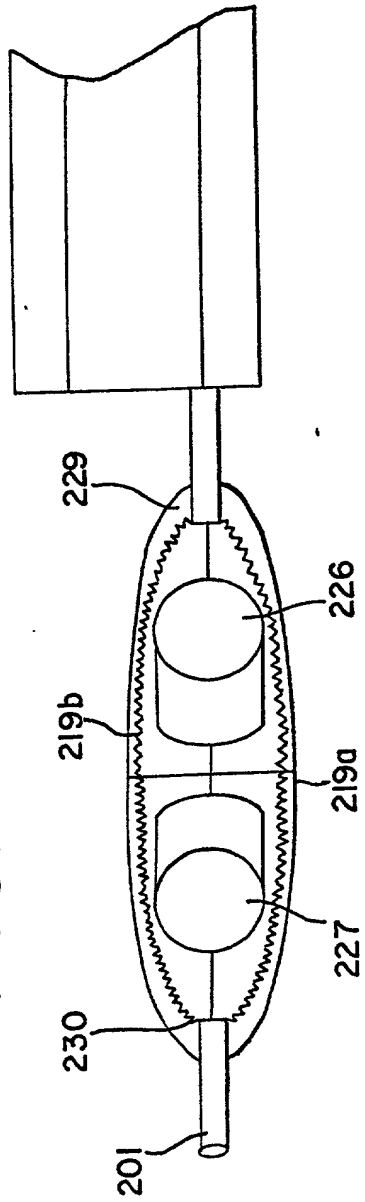


FIG.62A

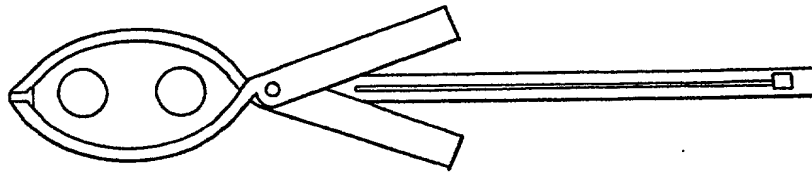


FIG.62B

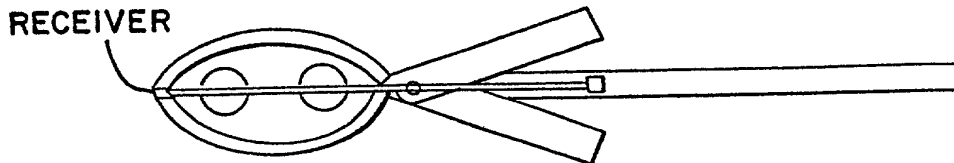
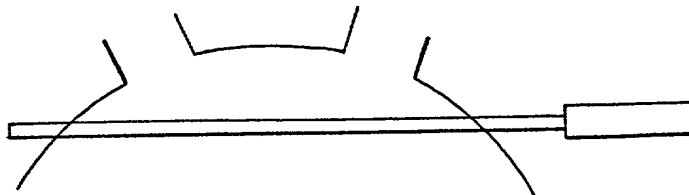


FIG.62C



Copyright © 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022, 2023, 2024, 2025, 2026, 2027, 2028, 2029, 2030, 2031, 2032, 2033, 2034, 2035, 2036, 2037, 2038, 2039, 2040, 2041, 2042, 2043, 2044, 2045, 2046, 2047, 2048, 2049, 2050, 2051, 2052, 2053, 2054, 2055, 2056, 2057, 2058, 2059, 2060, 2061, 2062, 2063, 2064, 2065, 2066, 2067, 2068, 2069, 2070, 2071, 2072, 2073, 2074, 2075, 2076, 2077, 2078, 2079, 2080, 2081, 2082, 2083, 2084, 2085, 2086, 2087, 2088, 2089, 2090, 2091, 2092, 2093, 2094, 2095, 2096, 2097, 2098, 2099, 2100, 2101, 2102, 2103, 2104, 2105, 2106, 2107, 2108, 2109, 2110, 2111, 2112, 2113, 2114, 2115, 2116, 2117, 2118, 2119, 2120, 2121, 2122, 2123, 2124, 2125, 2126, 2127, 2128, 2129, 2130, 2131, 2132, 2133, 2134, 2135, 2136, 2137, 2138, 2139, 2140, 2141, 2142, 2143, 2144, 2145, 2146, 2147, 2148, 2149, 2150, 2151, 2152, 2153, 2154, 2155, 2156, 2157, 2158, 2159, 2160, 2161, 2162, 2163, 2164, 2165, 2166, 2167, 2168, 2169, 2170, 2171, 2172, 2173, 2174, 2175, 2176, 2177, 2178, 2179, 2180, 2181, 2182, 2183, 2184, 2185, 2186, 2187, 2188, 2189, 2190, 2191, 2192, 2193, 2194, 2195, 2196, 2197, 2198, 2199, 2200, 2201, 2202, 2203, 2204, 2205, 2206, 2207, 2208, 2209, 2210, 2211, 2212, 2213, 2214, 2215, 2216, 2217, 2218, 2219, 2220, 2221, 2222, 2223, 2224, 2225, 2226, 2227, 2228, 2229, 2230, 2231, 2232, 2233, 2234, 2235, 2236, 2237, 2238, 2239, 2240, 2241, 2242, 2243, 2244, 2245, 2246, 2247, 2248, 2249, 2250, 2251, 2252, 2253, 2254, 2255, 2256, 2257, 2258, 2259, 2260, 2261, 2262, 2263, 2264, 2265, 2266, 2267, 2268, 2269, 2270, 2271, 2272, 2273, 2274, 2275, 2276, 2277, 2278, 2279, 2280, 2281, 2282, 2283, 2284, 2285, 2286, 2287, 2288, 2289, 2290, 2291, 2292, 2293, 2294, 2295, 2296, 2297, 2298, 2299, 2300, 2301, 2302, 2303, 2304, 2305, 2306, 2307, 2308, 2309, 2310, 2311, 2312, 2313, 2314, 2315, 2316, 2317, 2318, 2319, 2320, 2321, 2322, 2323, 2324, 2325, 2326, 2327, 2328, 2329, 2330, 2331, 2332, 2333, 2334, 2335, 2336, 2337, 2338, 2339, 2340, 2341, 2342, 2343, 2344, 2345, 2346, 2347, 2348, 2349, 2350, 2351, 2352, 2353, 2354, 2355, 2356, 2357, 2358, 2359, 2360, 2361, 2362, 2363, 2364, 2365, 2366, 2367, 2368, 2369, 2370, 2371, 2372, 2373, 2374, 2375, 2376, 2377, 2378, 2379, 2380, 2381, 2382, 2383, 2384, 2385, 2386, 2387, 2388, 2389, 2390, 2391, 2392, 2393, 2394, 2395, 2396, 2397, 2398, 2399, 2400, 2401, 2402, 2403, 2404, 2405, 2406, 2407, 2408, 2409, 2410, 2411, 2412, 2413, 2414, 2415, 2416, 2417, 2418, 2419, 2420, 2421, 2422, 2423, 2424, 2425, 2426, 2427, 2428, 2429, 2430, 2431, 2432, 2433, 2434, 2435, 2436, 2437, 2438, 2439, 2440, 2441, 2442, 2443, 2444, 2445, 2446, 2447, 2448, 2449, 2450, 2451, 2452, 2453, 2454, 2455, 2456, 2457, 2458, 2459, 2460, 2461, 2462, 2463, 2464, 2465, 2466, 2467, 2468, 2469, 2470, 2471, 2472, 2473, 2474, 2475, 2476, 2477, 2478, 2479, 2480, 2481, 2482, 2483, 2484, 2485, 2486, 2487, 2488, 2489, 2490, 2491, 2492, 2493, 2494, 2495, 2496, 2497, 2498, 2499, 2500, 2501, 2502, 2503, 2504, 2505, 2506, 2507, 2508, 2509, 2510, 2511, 2512, 2513, 2514, 2515, 2516, 2517, 2518, 2519, 2520, 2521, 2522, 2523, 2524, 2525, 2526, 2527, 2528, 2529, 2530, 2531, 2532, 2533, 2534, 2535, 2536, 2537, 2538, 2539, 2540, 2541, 2542, 2543, 2544, 2545, 2546, 2547, 2548, 2549, 2550, 2551, 2552, 2553, 2554, 2555, 2556, 2557, 2558, 2559, 2560, 2561, 2562, 2563, 2564, 2565, 2566, 2567, 2568, 2569, 2570, 2571, 2572, 2573, 2574, 2575, 2576, 2577, 2578, 2579, 2580, 2581, 2582, 2583, 2584, 2585, 2586, 2587, 2588, 2589, 2590, 2591, 2592, 2593, 2594, 2595, 2596, 2597, 2598, 2599, 2600, 2601, 2602, 2603, 2604, 2605, 2606, 2607, 2608, 2609, 2610, 2611, 2612, 2613, 2614, 2615, 2616, 2617, 2618, 2619, 2620, 2621, 2622, 2623, 2624, 2625, 2626, 2627, 2628, 2629, 2630, 2631, 2632, 2633, 2634, 2635, 2636, 2637, 2638, 2639, 2640, 2641, 2642, 2643, 2644, 2645, 2646, 2647, 2648, 2649, 2650, 2651, 2652, 2653, 2654, 2655, 2656, 2657, 2658, 2659, 2660, 2661, 2662, 2663, 2664, 2665, 2666, 2667, 2668, 2669, 2670, 2671, 2672, 2673, 2674, 2675, 2676, 2677, 2678, 2679, 2680, 2681, 2682, 2683, 2684, 2685, 2686, 2687, 2688, 2689, 2690, 2691, 2692, 2693, 2694, 2695, 2696, 2697, 2698, 2699, 2700, 2701, 2702, 2703, 2704, 2705, 2706, 2707, 2708, 2709, 2710, 2711, 2712, 2713, 2714, 2715, 2716, 2717, 2718, 2719, 2720, 2721, 2722, 2723, 2724, 2725, 2726, 2727, 2728, 2729, 2730, 2731, 2732, 2733, 2734, 2735, 2736, 2737, 2738, 2739, 2740, 2741, 2742, 2743, 2744, 2745, 2746, 2747, 2748, 2749, 2750, 2751, 2752, 2753, 2754, 2755, 2756, 2757, 2758, 2759, 2760, 2761, 2762, 2763, 2764, 2765, 2766, 2767, 2768, 2769, 2770, 2771, 2772, 2773, 2774, 2775, 2776, 2777, 2778, 2779, 2780, 2781, 2782, 2783, 2784, 2785, 2786, 2787, 2788, 2789, 2790, 2791, 2792, 2793, 2794, 2795, 2796, 2797, 2798, 2799, 2800, 2801, 2802, 2803, 2804, 2805, 2806, 2807, 2808, 2809, 2810, 2811, 2812, 2813, 2814, 2815, 2816, 2817, 2818, 2819, 2820, 2821, 2822, 2823, 2824, 2825, 2826, 2827, 2828, 2829, 2830, 2831, 2832, 2833, 2834, 2835, 2836, 2837, 2838, 2839, 2840, 2841, 2842, 2843, 2844, 2845, 2846, 2847, 2848, 2849, 2850, 2851, 2852, 2853, 2854, 2855, 2856, 2857, 2858, 2859, 2860, 2861, 2862, 2863, 2864, 2865, 2866, 2867, 2868, 2869, 2870, 2871, 2872, 2873, 2874, 2875, 2876, 2877, 2878, 2879, 2880, 2881, 2882, 2883, 2884, 2885, 2886, 2887, 2888, 2889, 2890, 2891, 2892, 2893, 2894, 2895, 2896, 2897, 2898, 2899, 2900, 2901, 2902, 2903, 2904, 2905, 2906, 2907, 2908, 2909, 2910, 2911, 2912, 2913, 2914, 2915, 2916, 2917, 2918, 2919, 2920, 2921, 2922, 2923, 2924, 2925, 2926, 2927, 2928, 2929, 2930, 2931, 2932, 2933, 2934, 2935, 2936, 2937, 2938, 2939, 2940, 2941, 2942, 2943, 2944, 2945, 2946, 2947, 2948, 2949, 2950, 2951, 2952, 2953, 2954, 2955, 2956, 2957, 2958, 2959, 2960, 2961, 2962, 2963, 2964, 2965, 2966, 2967, 2968, 2969, 2970, 2971, 2972, 2973, 2974, 2975, 2976, 2977, 2978, 2979, 2980, 2981, 2982, 2983, 2984, 2985, 2986, 2987, 2988, 2989, 2990, 2991, 2992, 2993, 2994, 2995, 2996, 2997, 2998, 2999, 3000

FIG. 62D

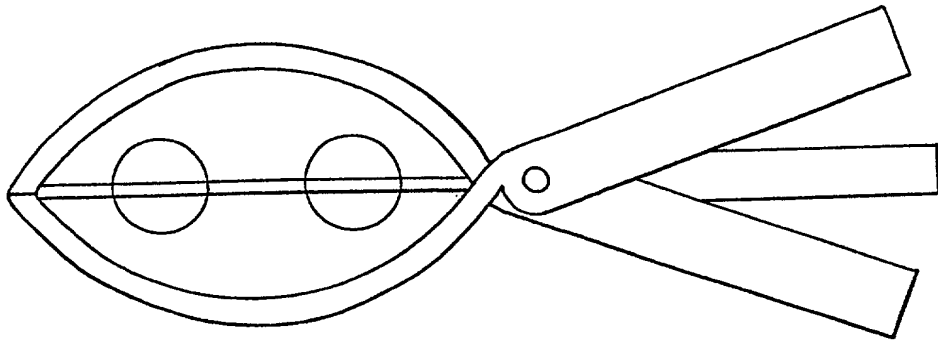


FIG. 62E

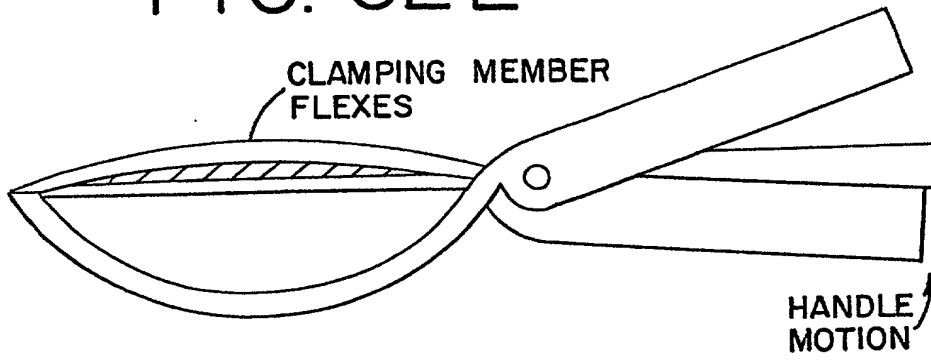


FIG. 62F

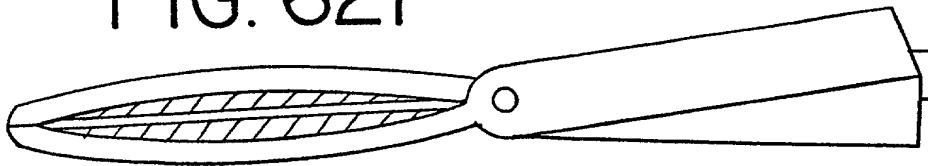


FIG. 62D



FIG. 62G

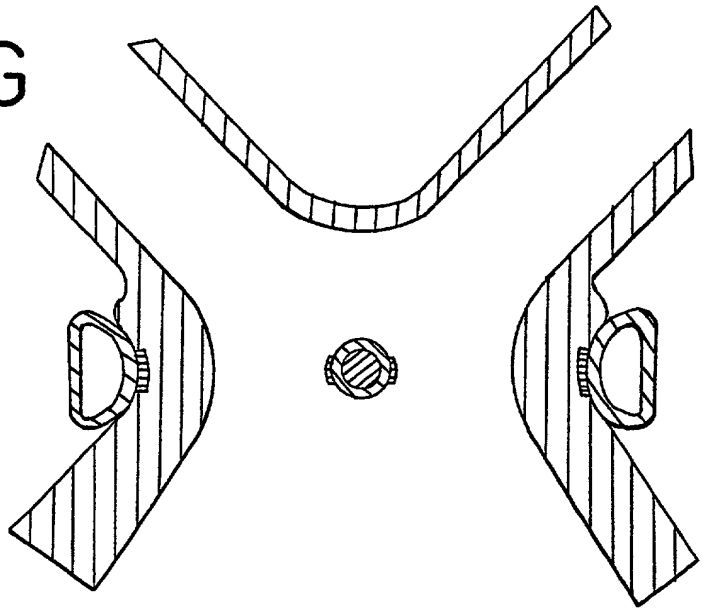


FIG. 62H

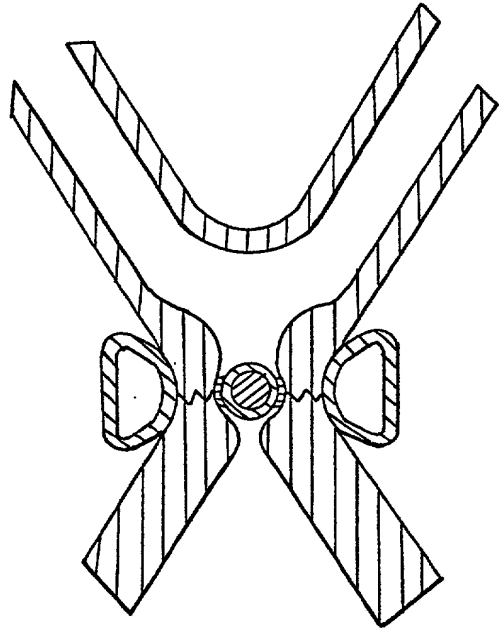
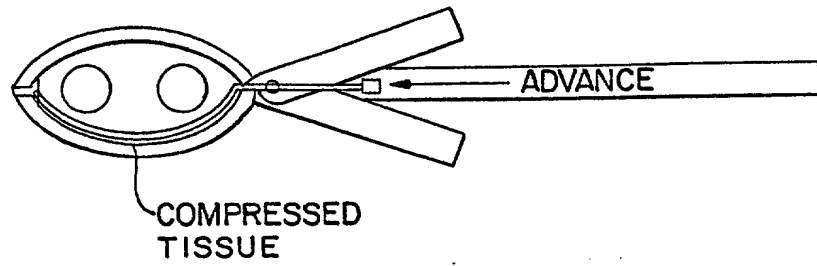


FIG. 62I



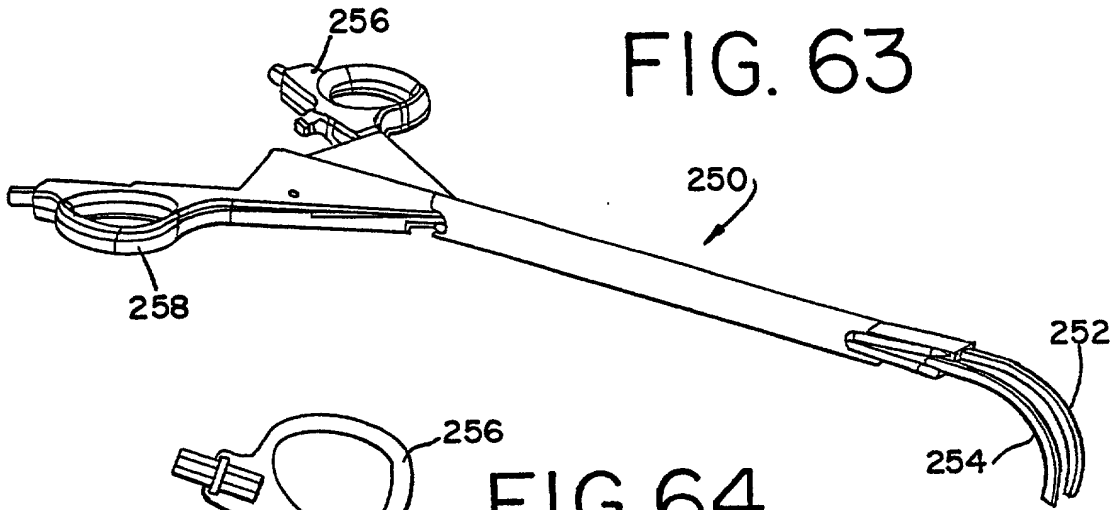


FIG. 63

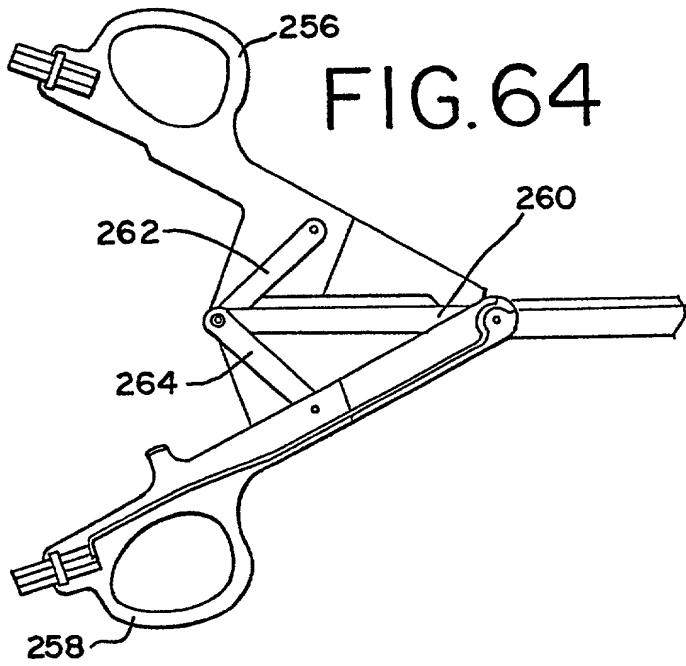


FIG. 64

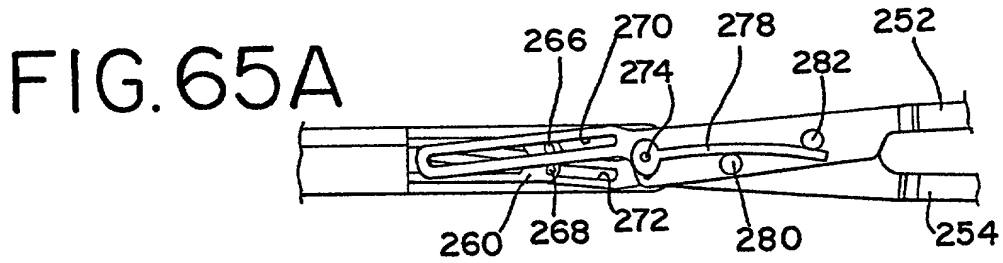


FIG. 65A

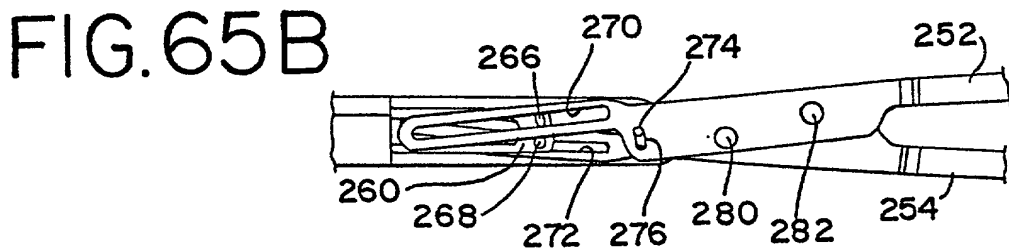


FIG. 65B

FIG. 63

FIG. 66

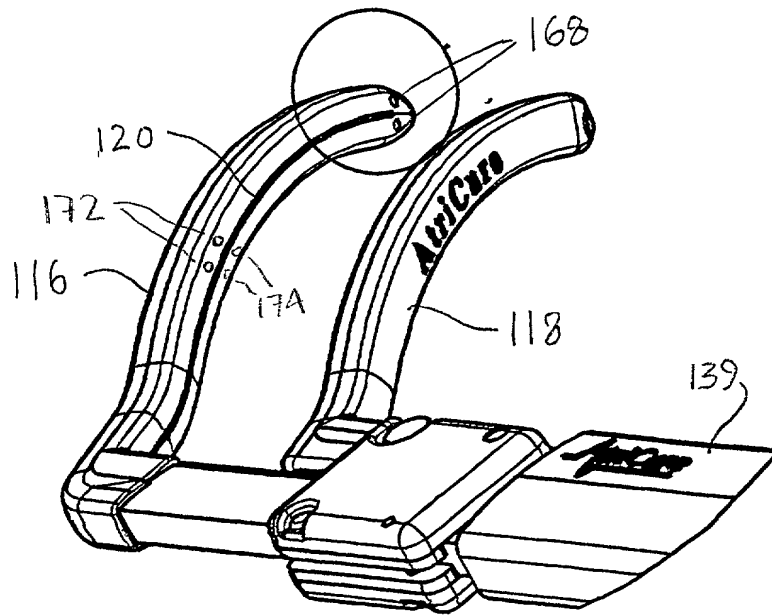


FIG. 67

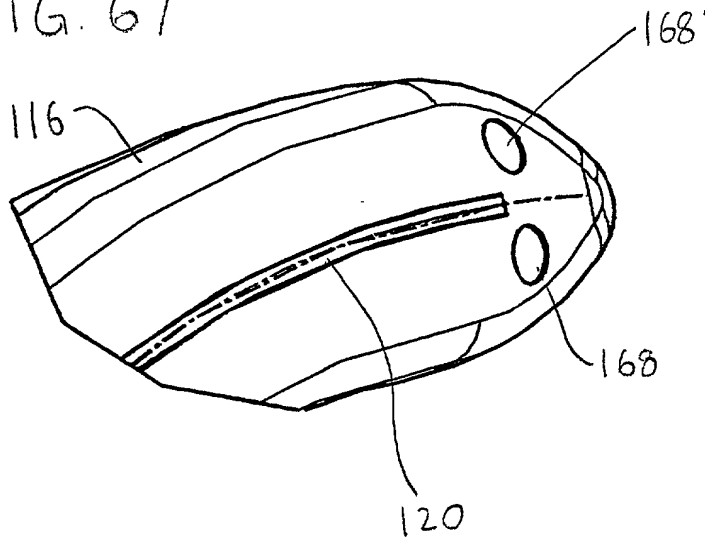


FIG. 66 of the present invention is shown in perspective view. FIG. 67 of the present invention is shown in perspective view.

FIG. 68 is a schematic diagram of a human torso showing the ribcage and heart. The diagram is labeled with various anatomical and structural markers: 'R' with an arrow pointing to the right side, 'RL' for the right lung, 'LL' for the left lung, 'ST' for the sternum, 'HEART' for the heart, 'XP' for the xiphoid process, '300' for the lower ribcage area, and 'C' for the center. A dashed vertical line indicates the midline.

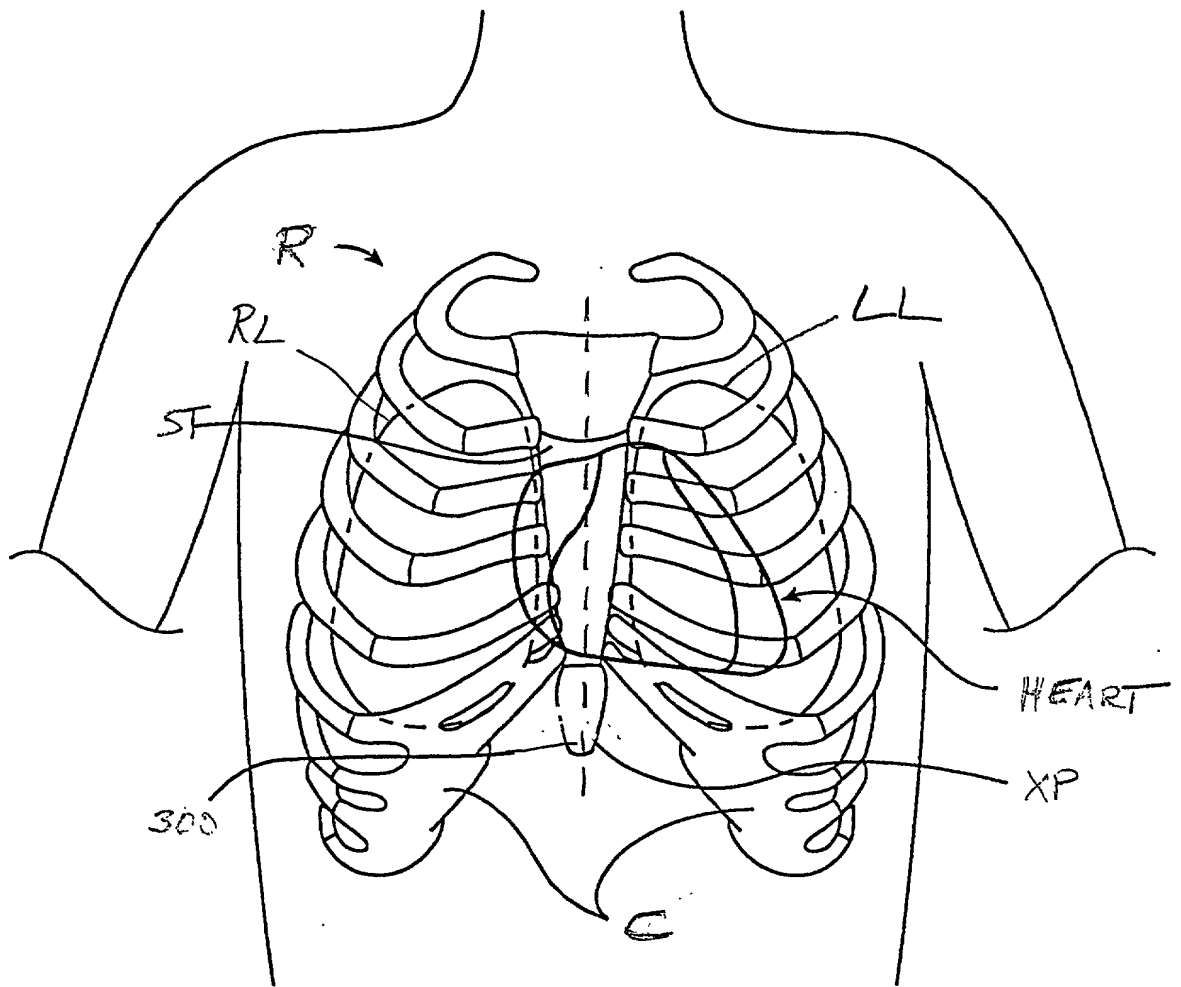


FIG. 68

FIG. 69

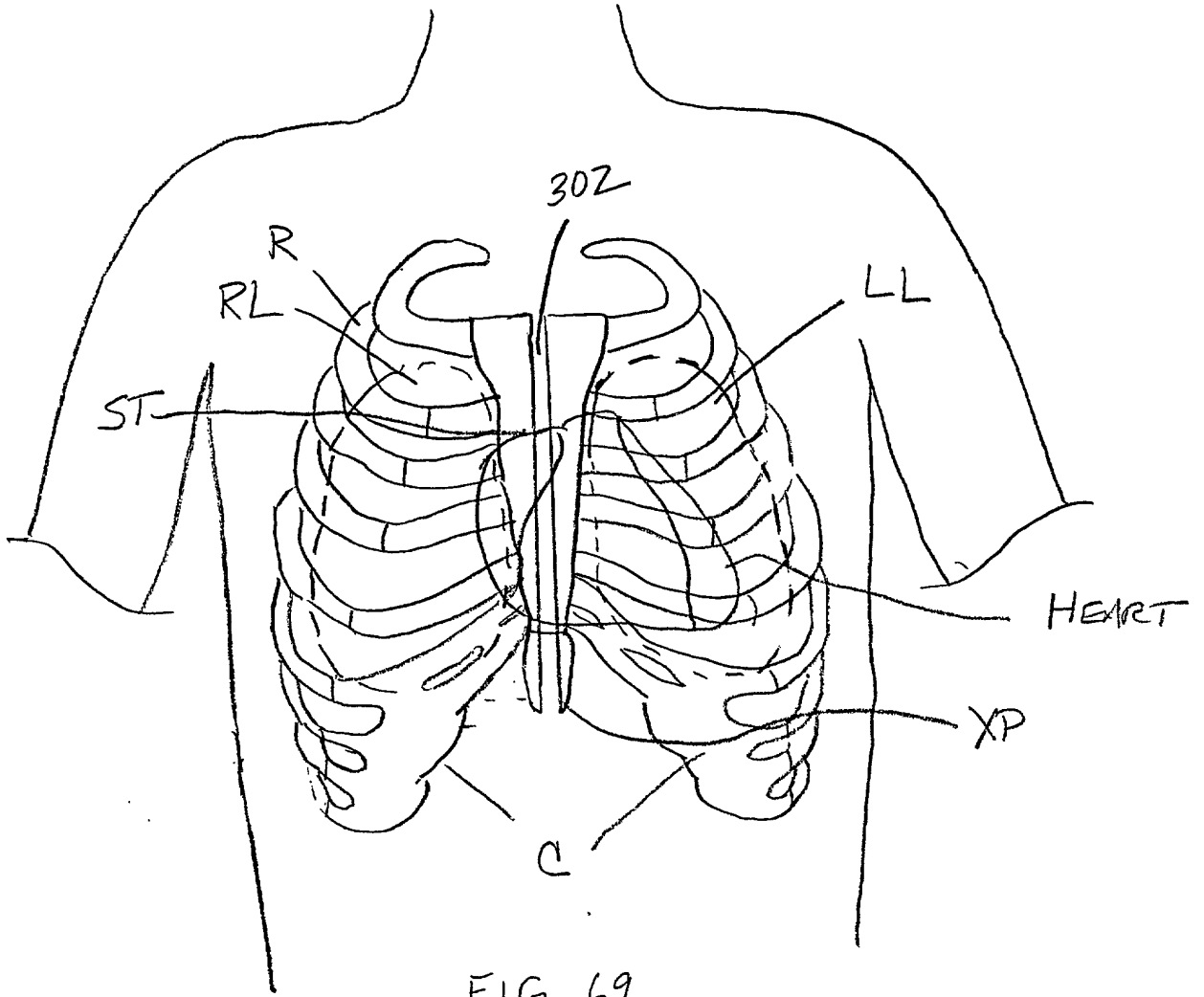
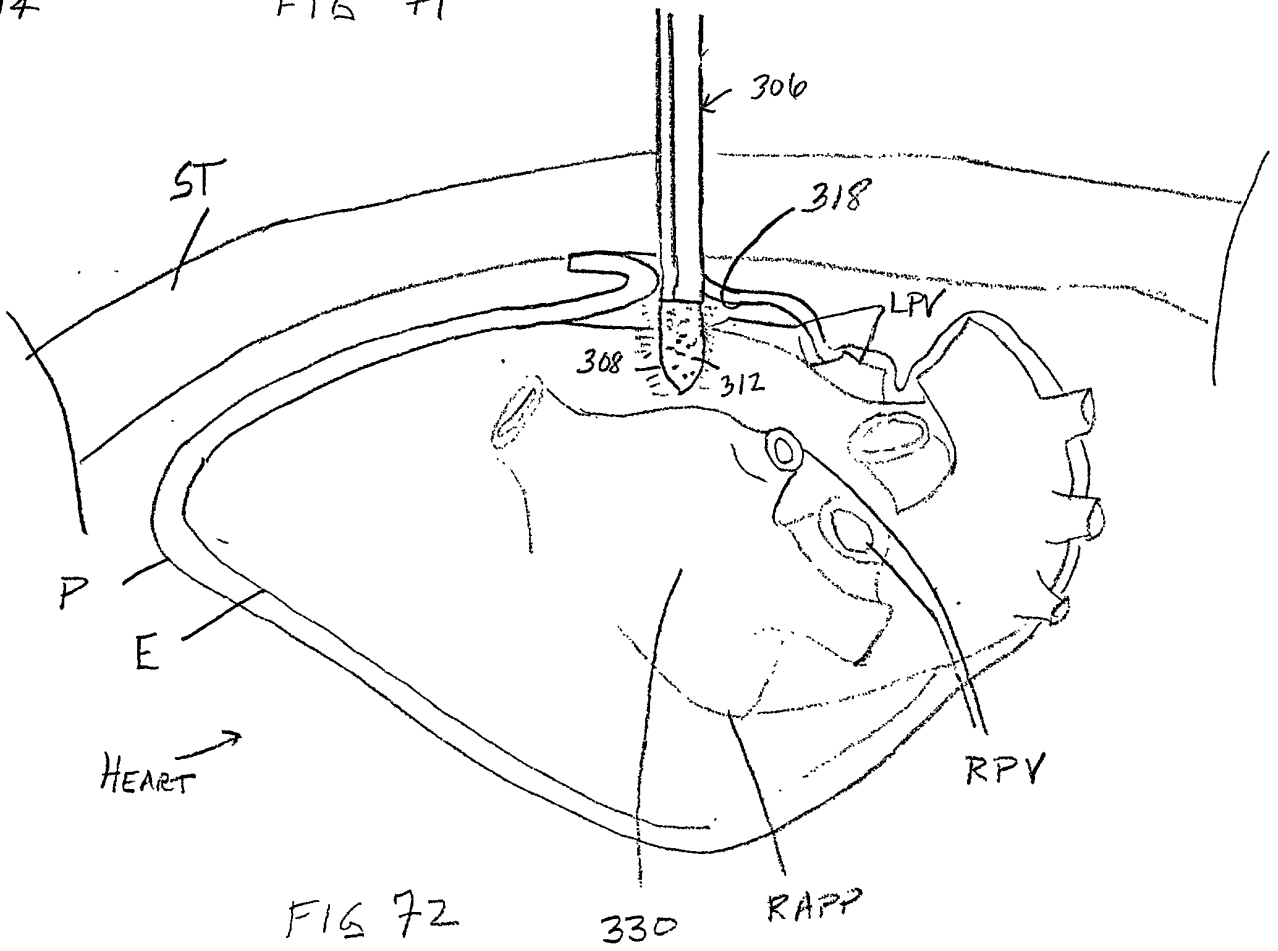
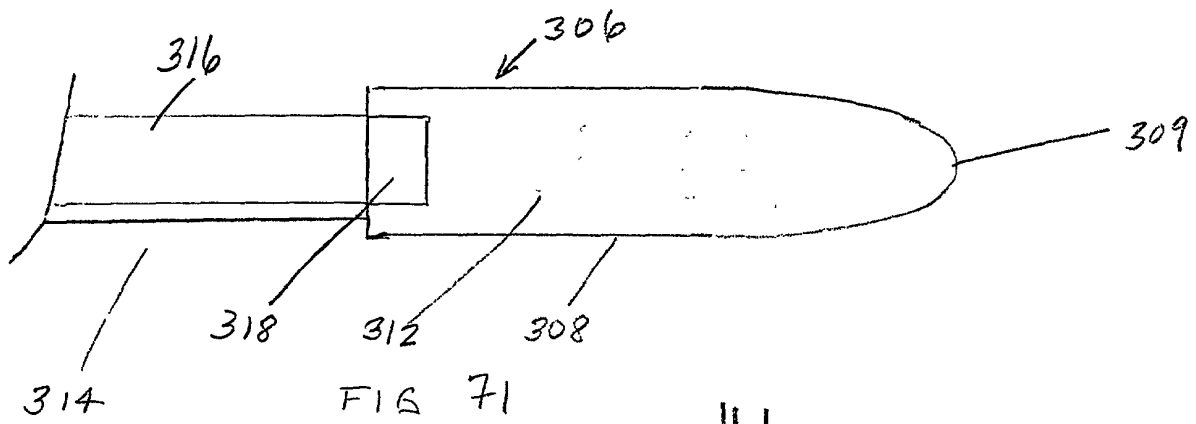
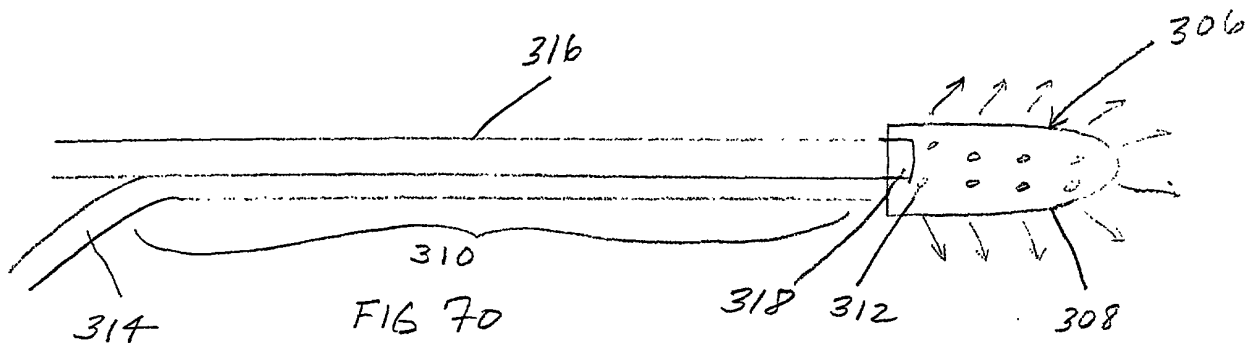


FIG. 69



This drawing is a schematic diagram of a heart with a catheter inserted into the right atrium. The catheter is labeled 306 and its head is labeled 308. The heart is labeled HEART and the chest wall is labeled ST. The right atrium is labeled RAPP, the right ventricle is labeled RV, the left ventricle is labeled LV, and the left atrium is labeled LA. The catheter is inserted through the chest wall (ST) and into the RAPP. The catheter's head (308) is positioned near the tricuspid valve (312). Labels P, E, and HEART are also present.

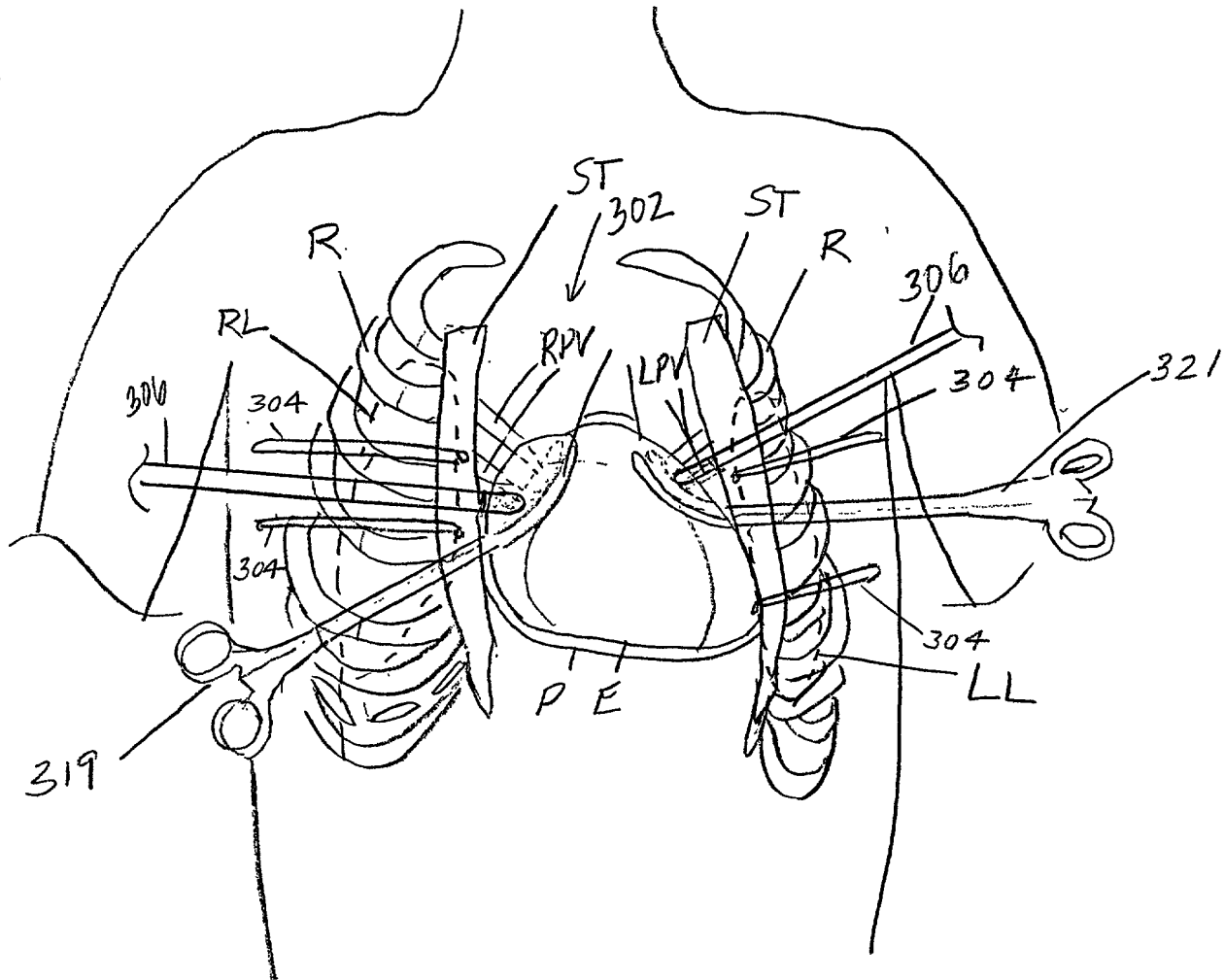


FIG. 73

FIG 74

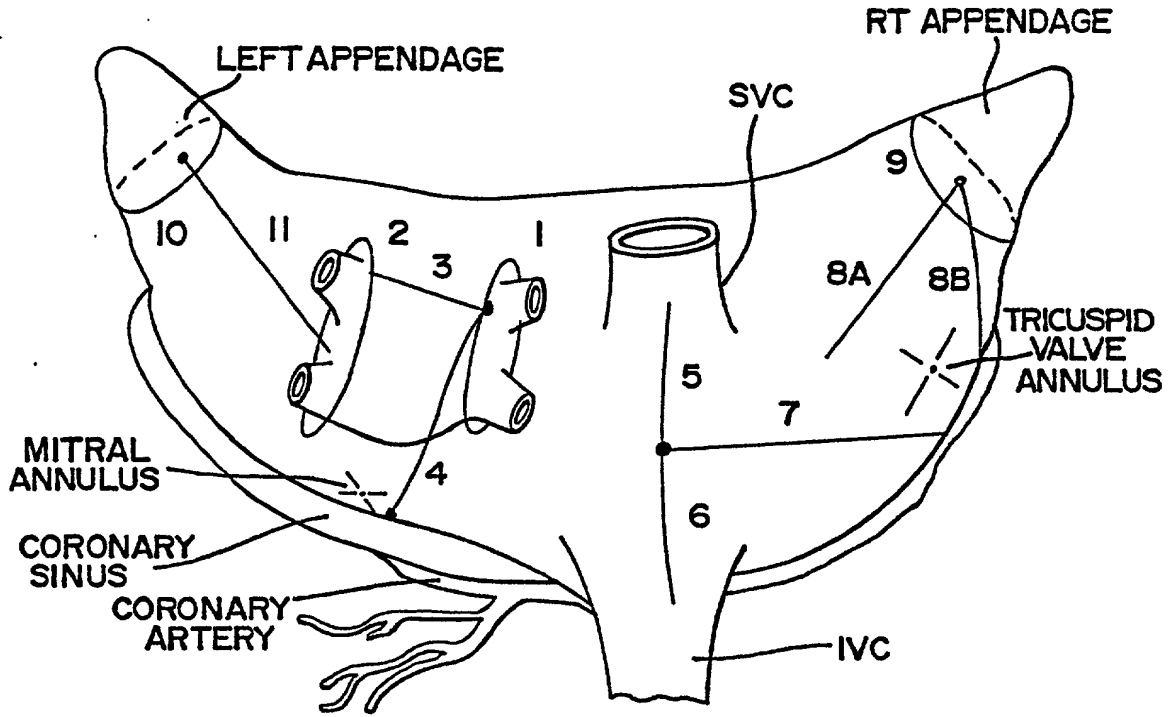


FIG. 75

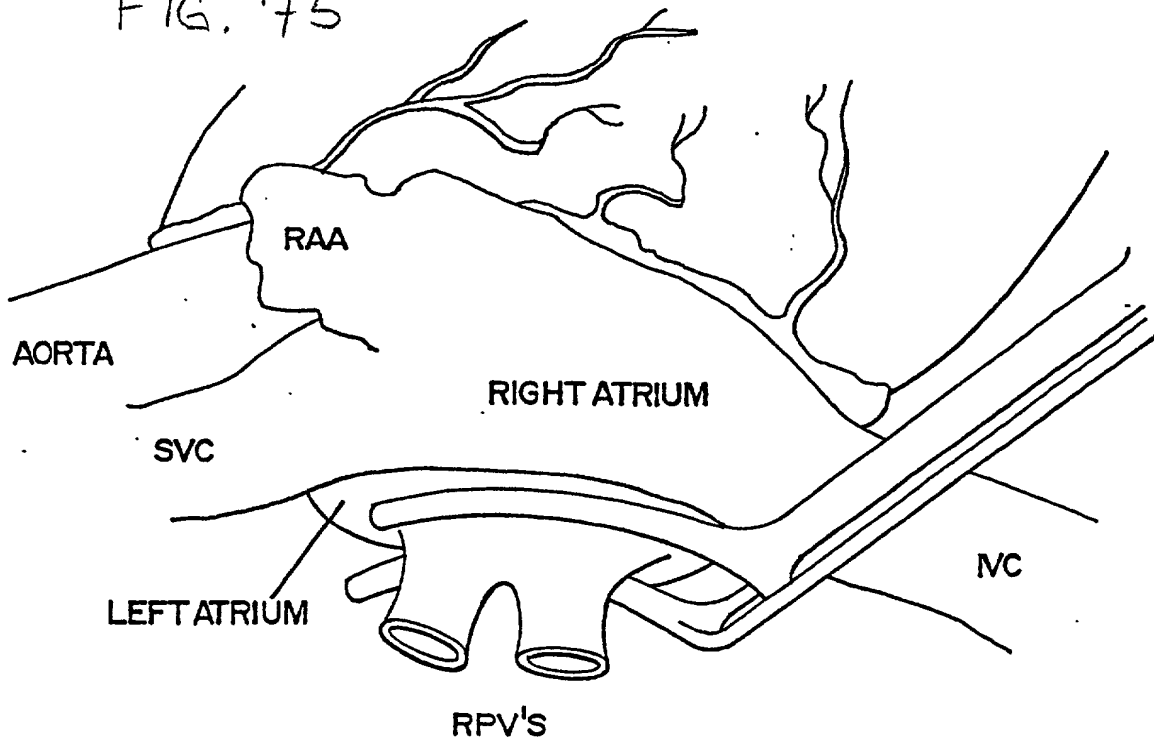




FIG. 76

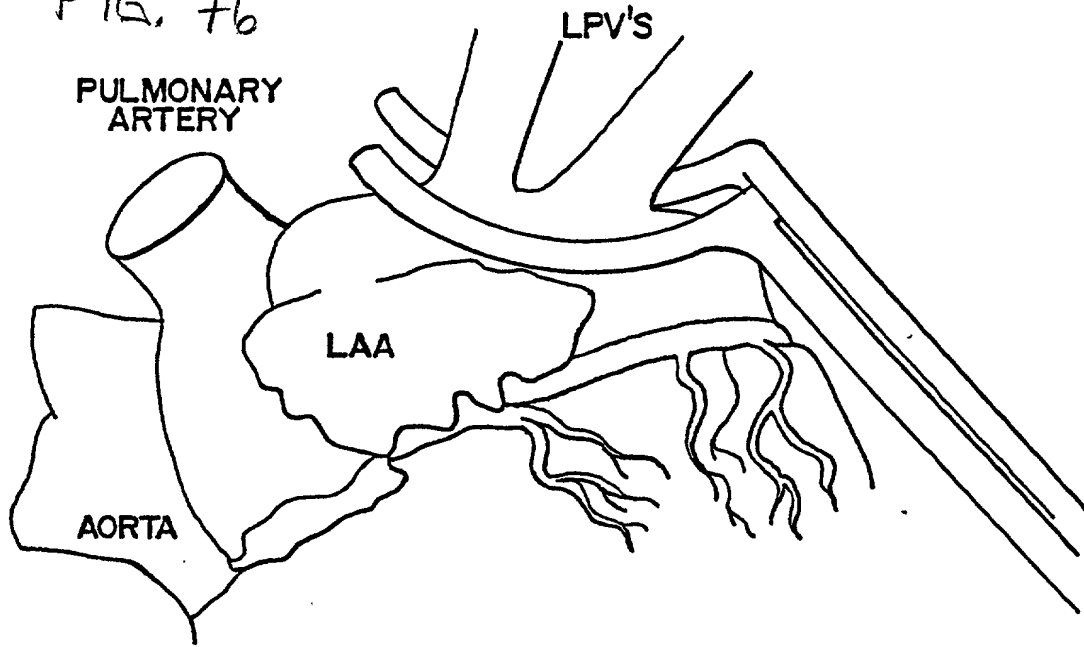


FIG. 77

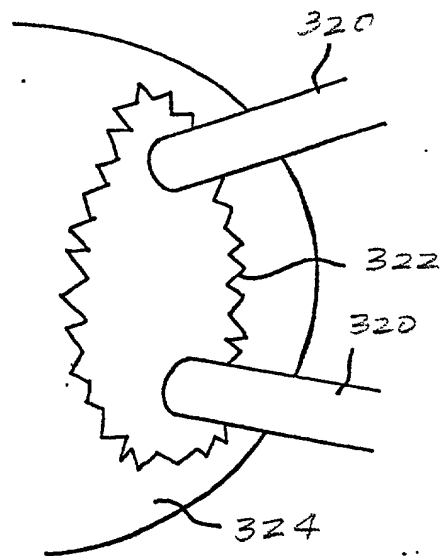


FIG. 78 of the drawing is a schematic diagram of the human torso showing the rib cage and heart. The diagram is labeled with various letters and numbers: 'R' for the right side, 'RL' for the right lung, 'LL' for the left lung, 'HEART' for the heart, 'XP' for the xiphoid process, 'C' for the sternum, '336' for the right lung, and '337' for the left lung. The drawing is a line drawing and is oriented vertically on the page.

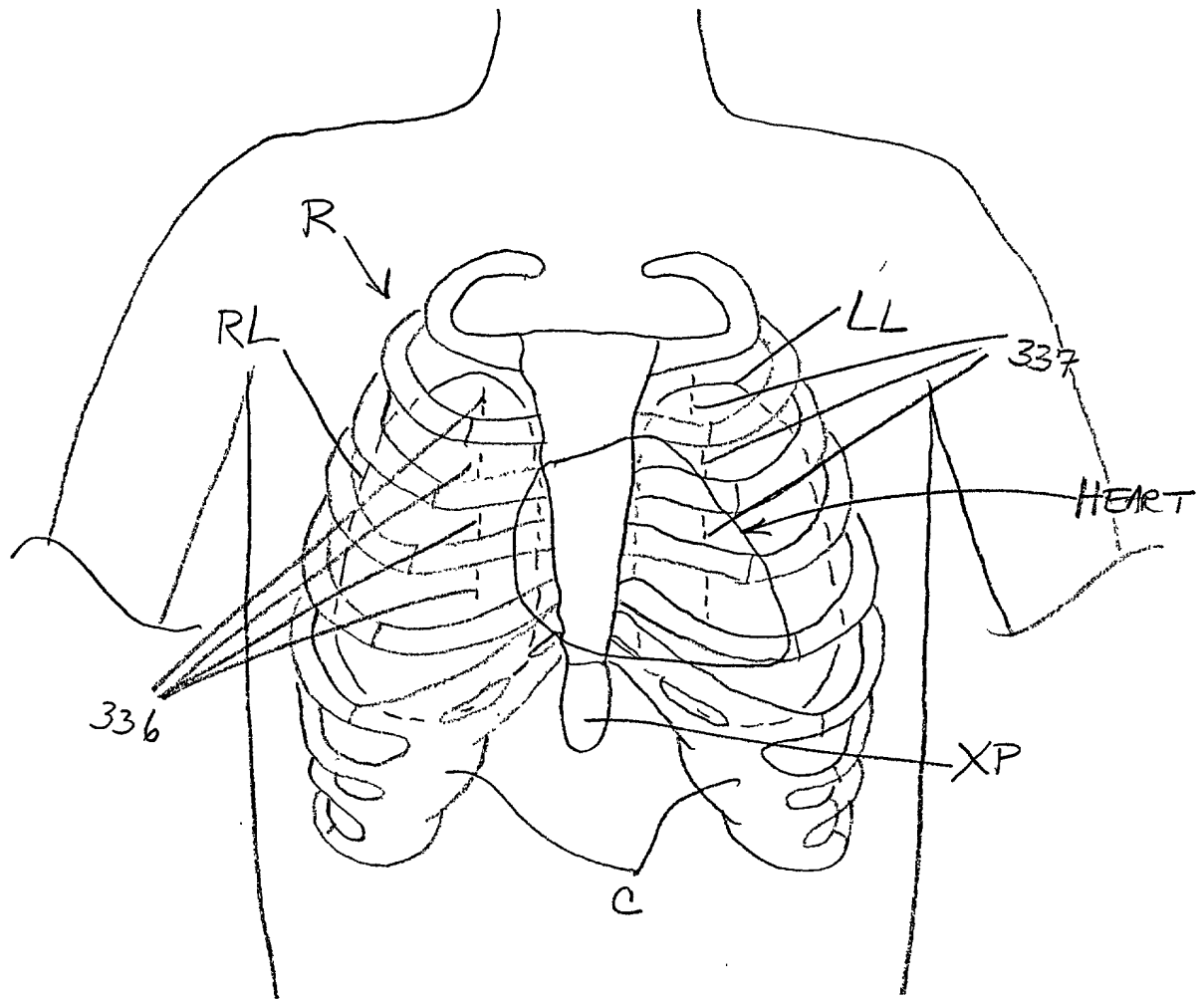


FIG. 78

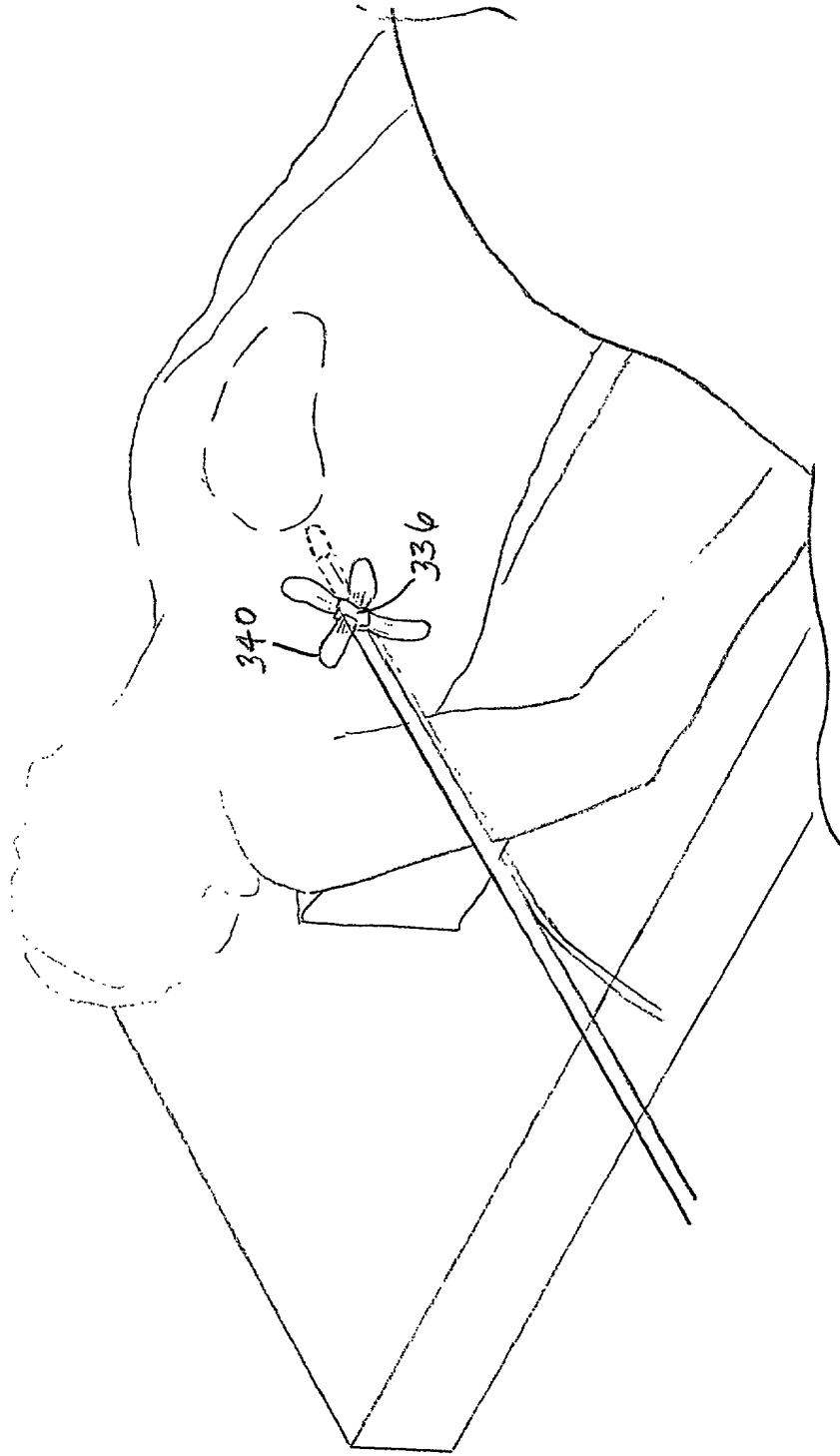


FIG. 79

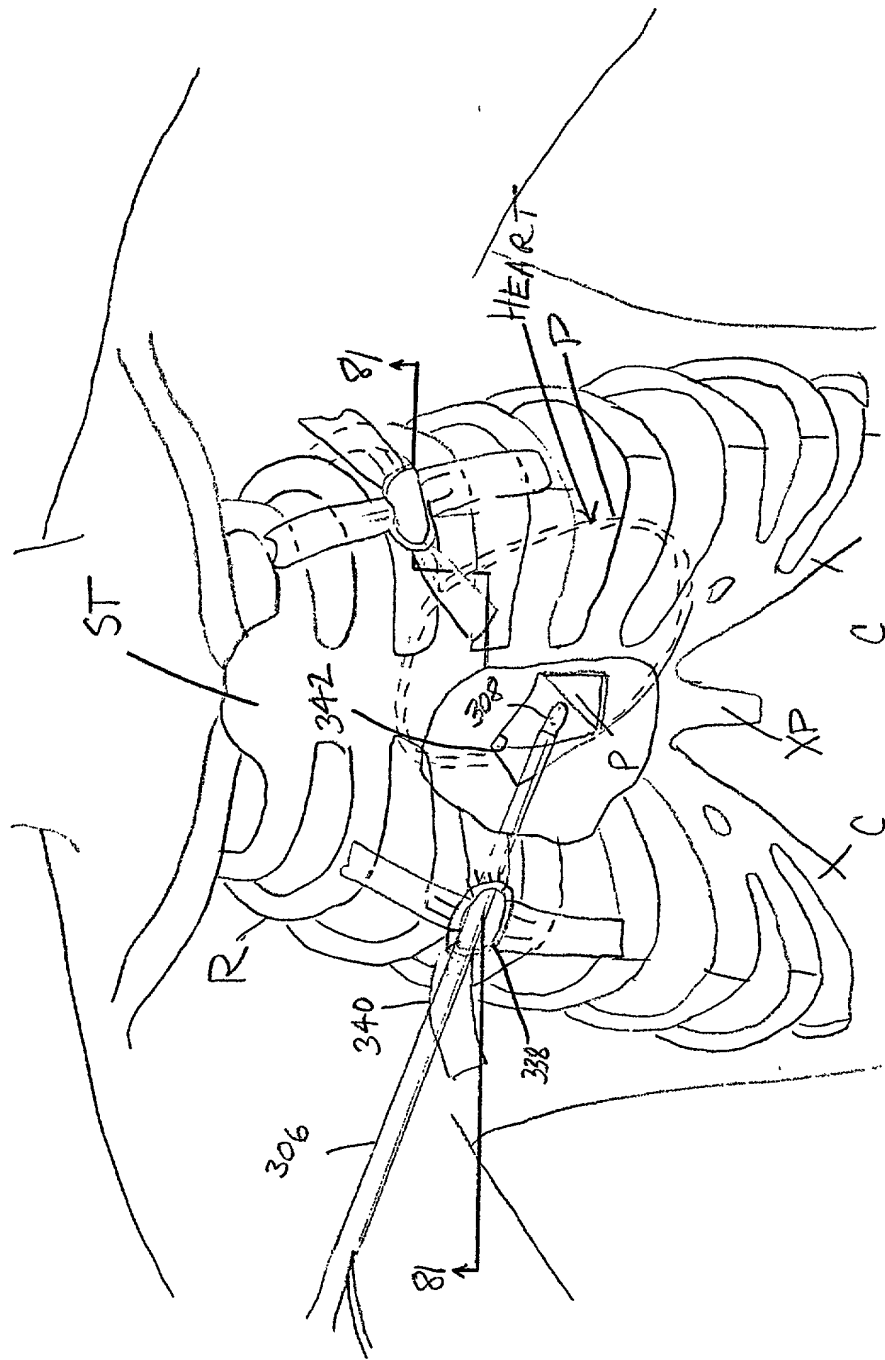


FIG. 80

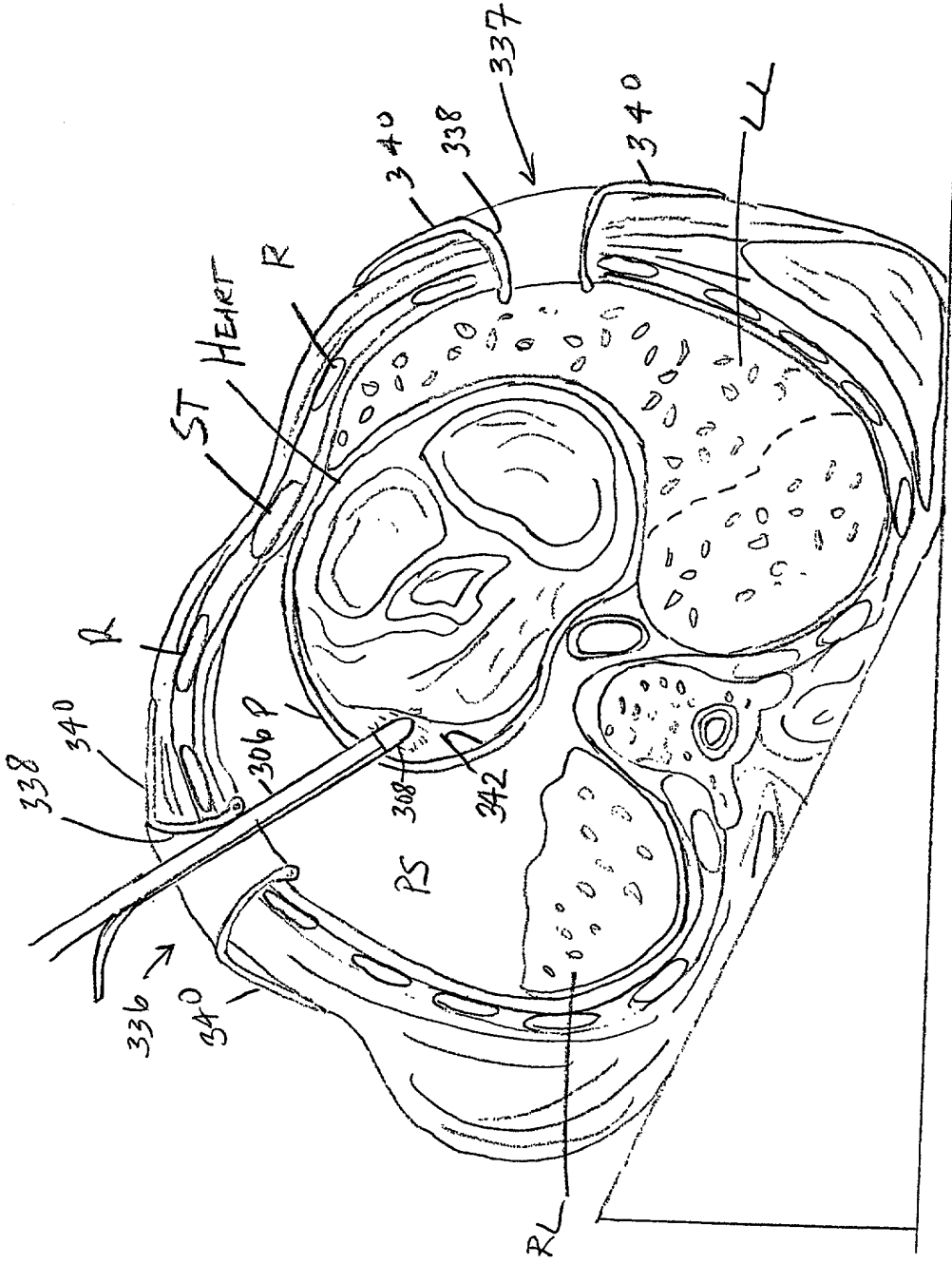


FIG. 81

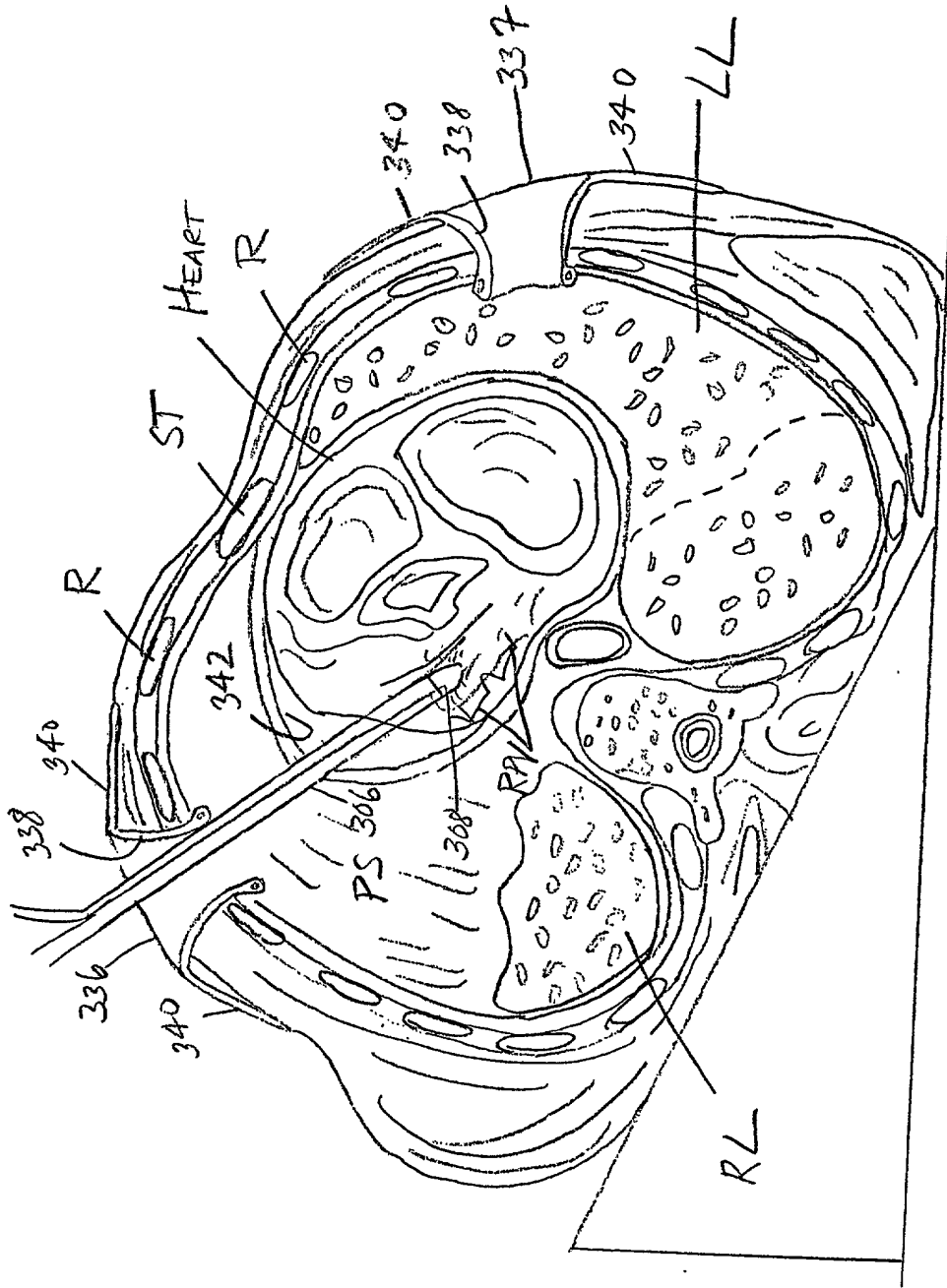


FIG. 82

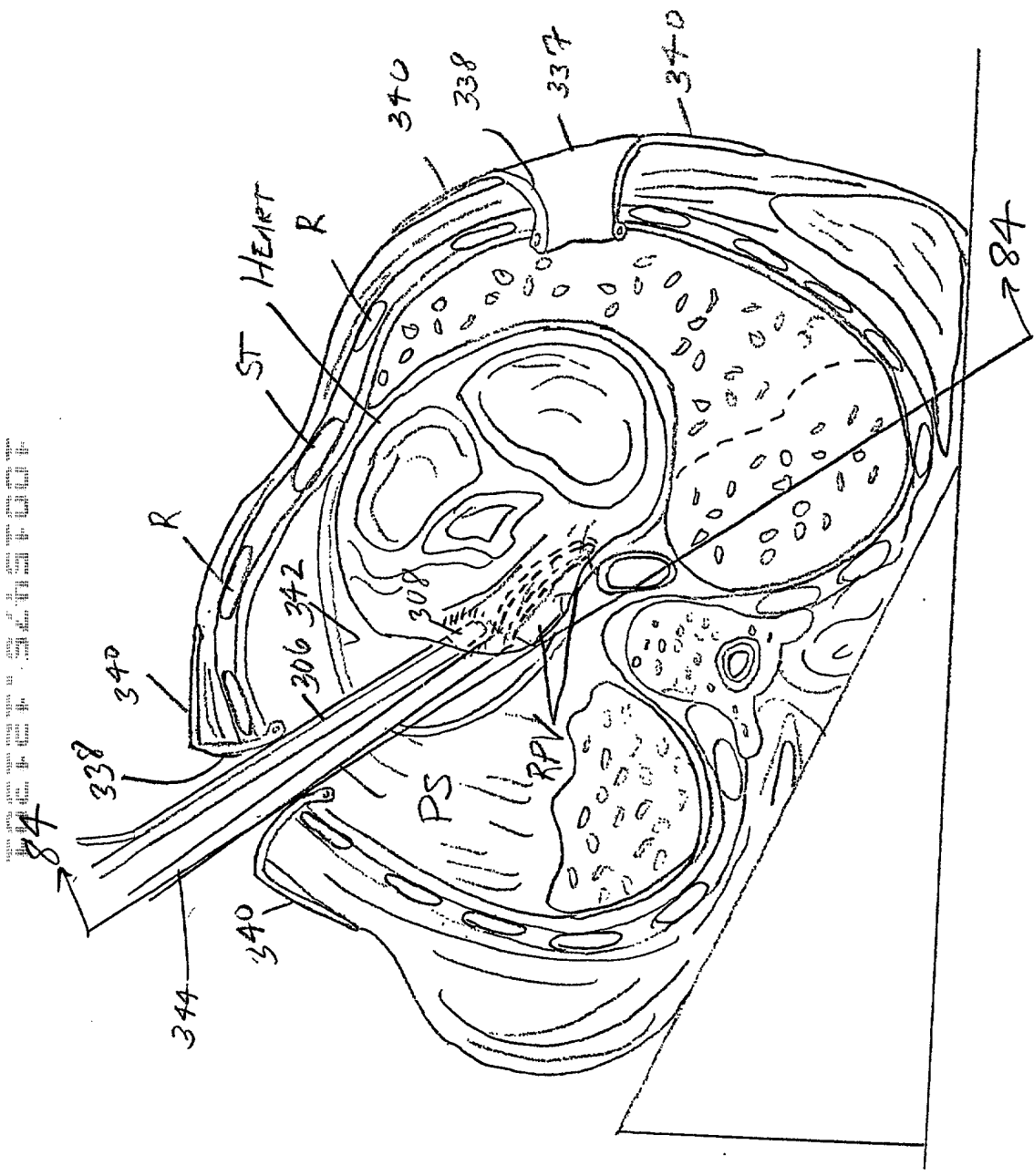


FIG 83

FIG. 83

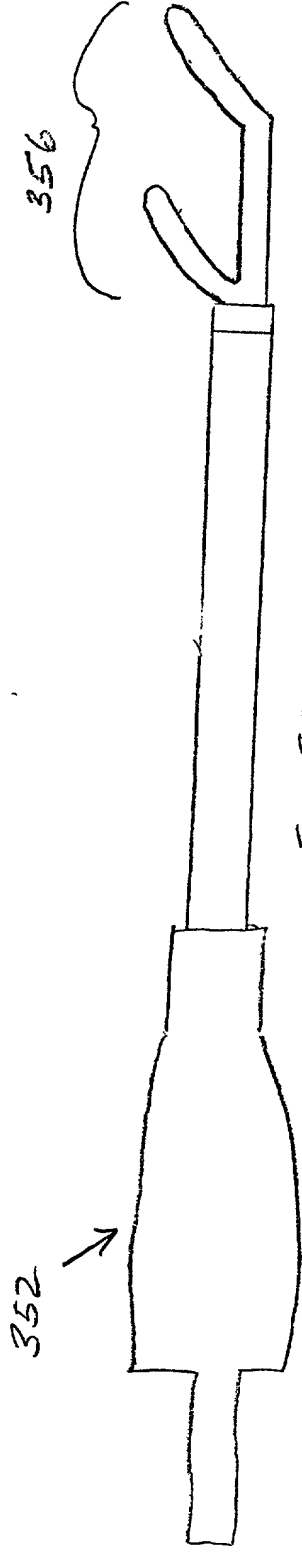


FIG. 83

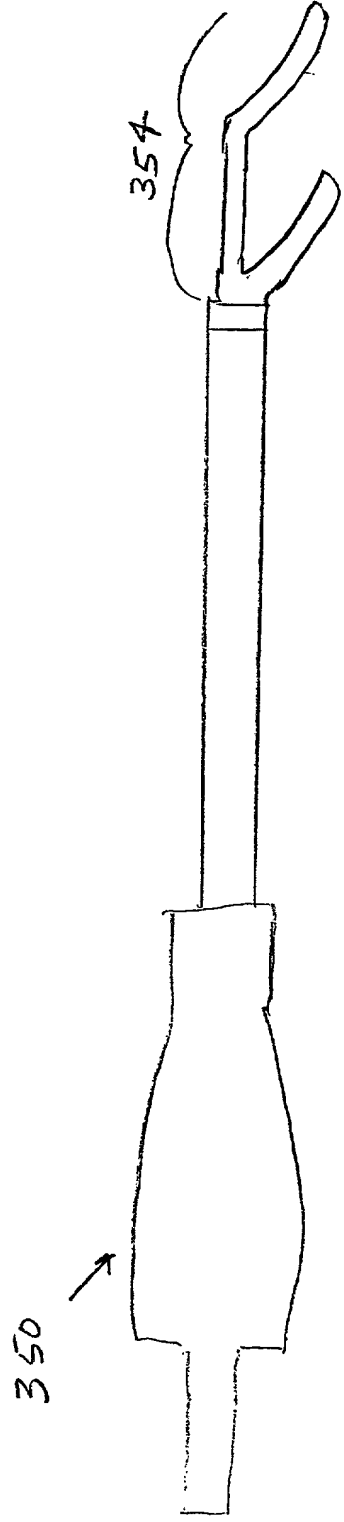


FIG. 83A





FIG. 85

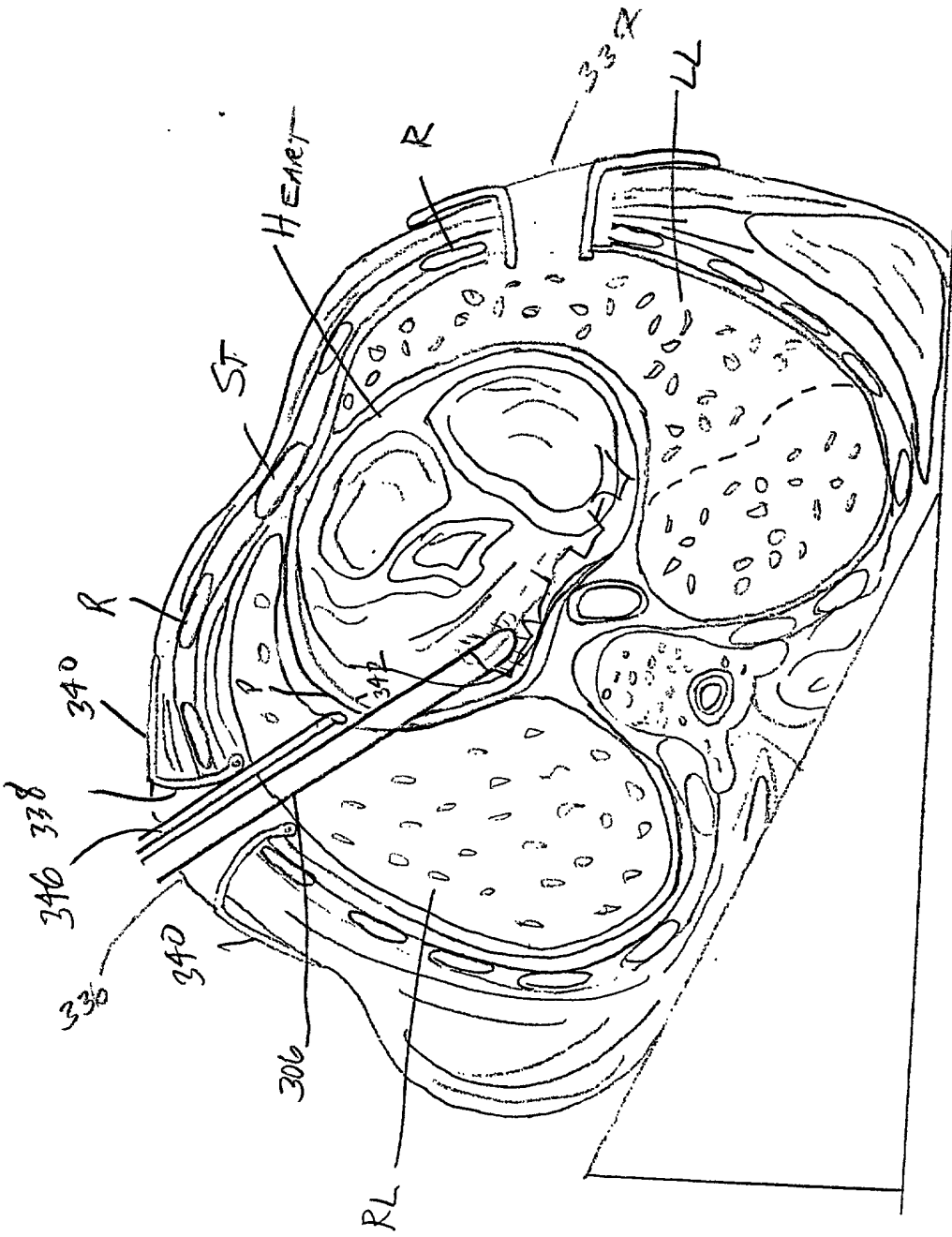


FIG. 85

338

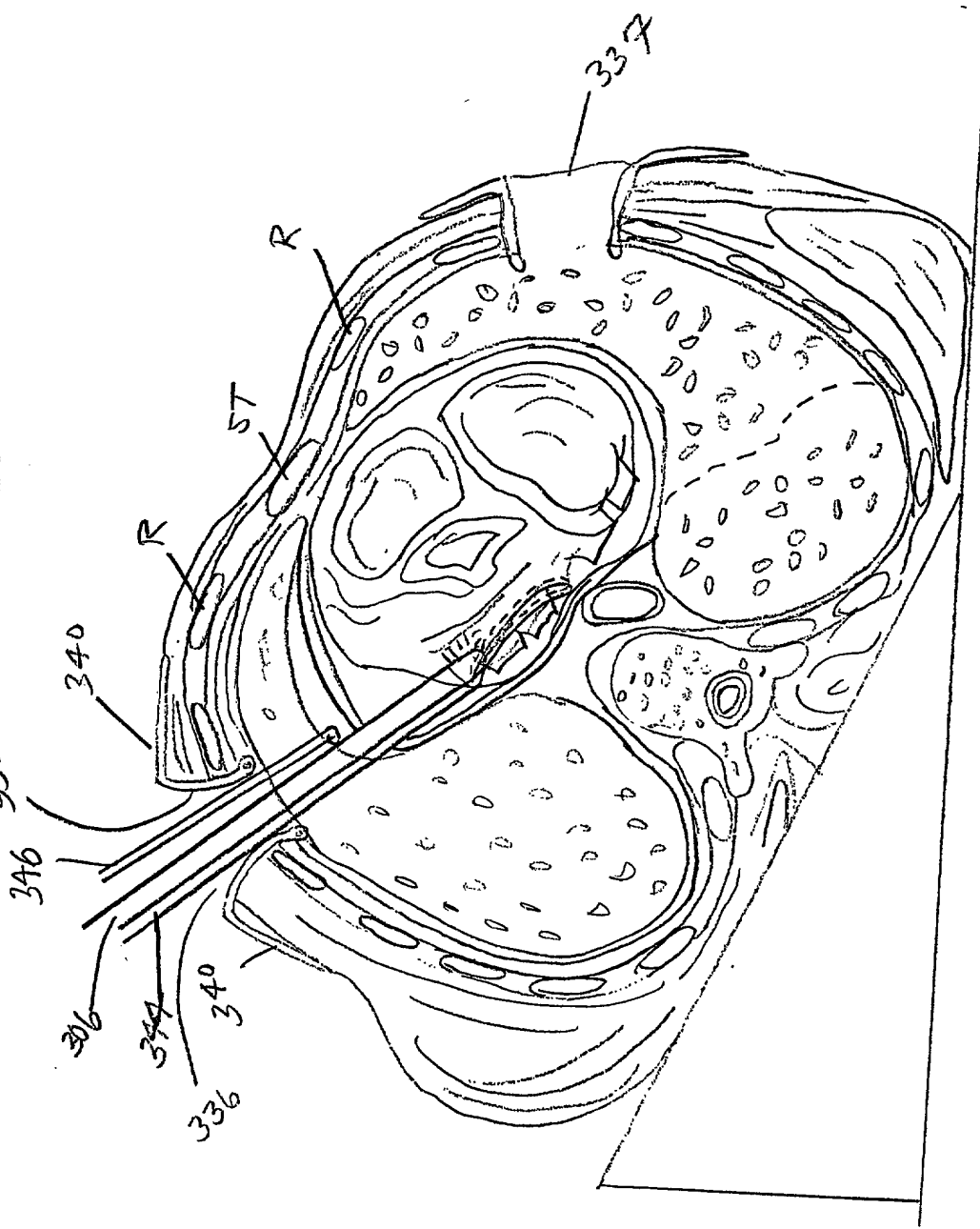


FIG 86

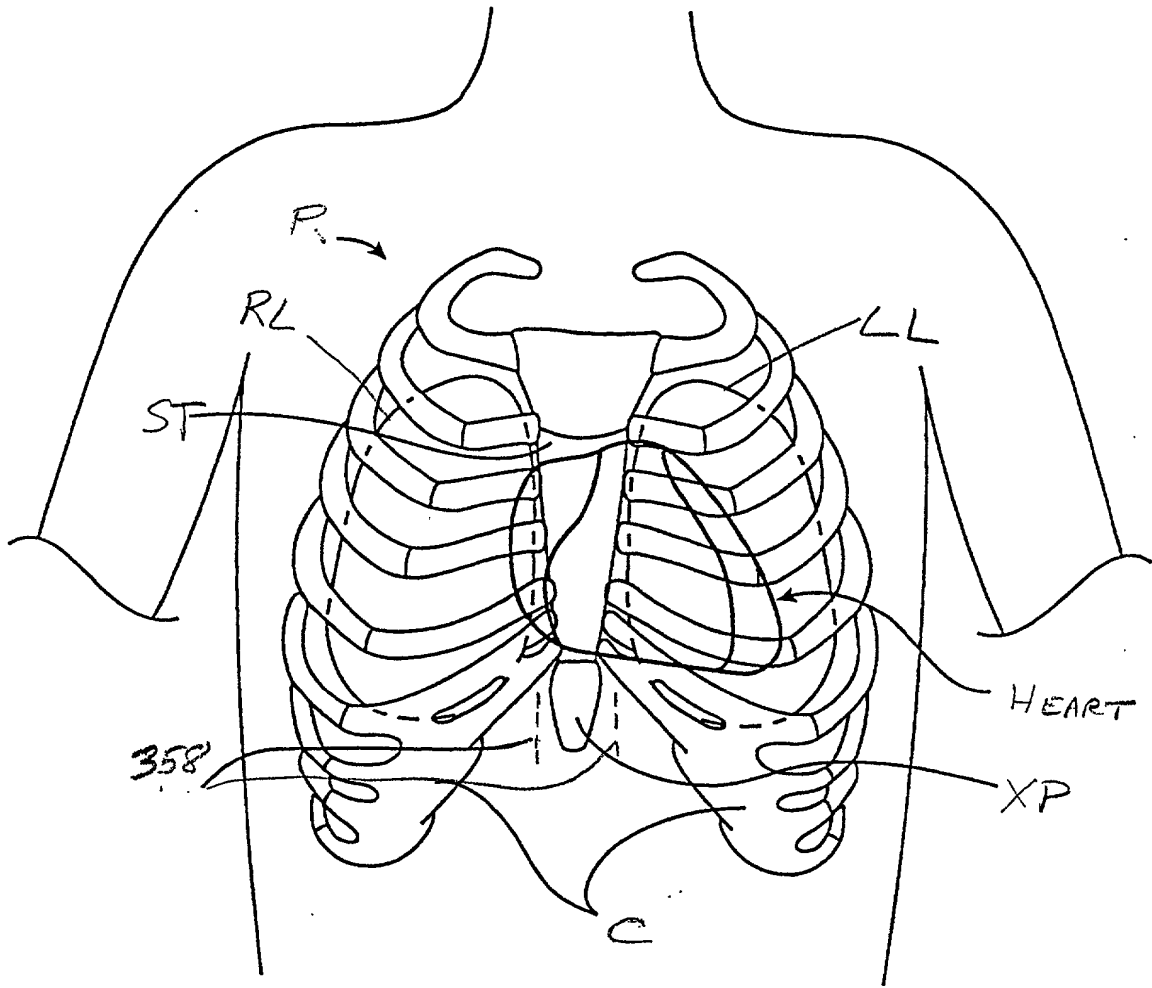


FIG. 87

FIG. 88

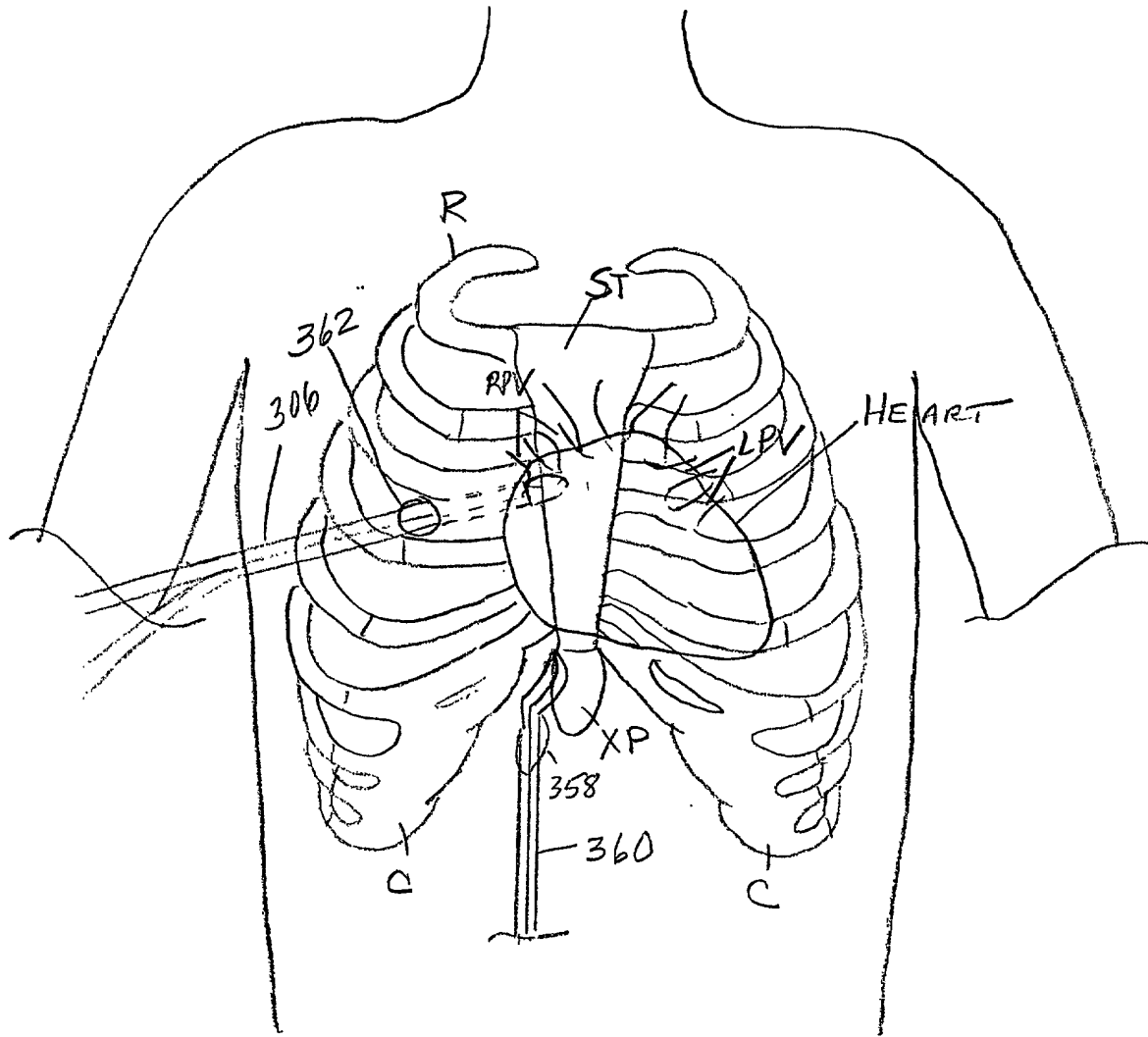


FIG. 88

FIG. 89 is a schematic diagram of a heart with a catheter system inserted into the right ventricle. The catheter system includes a catheter 306, a catheter 342, and a catheter 360. The heart is labeled with RPV (Right Ventricle) and RAPP (Right Atrium).

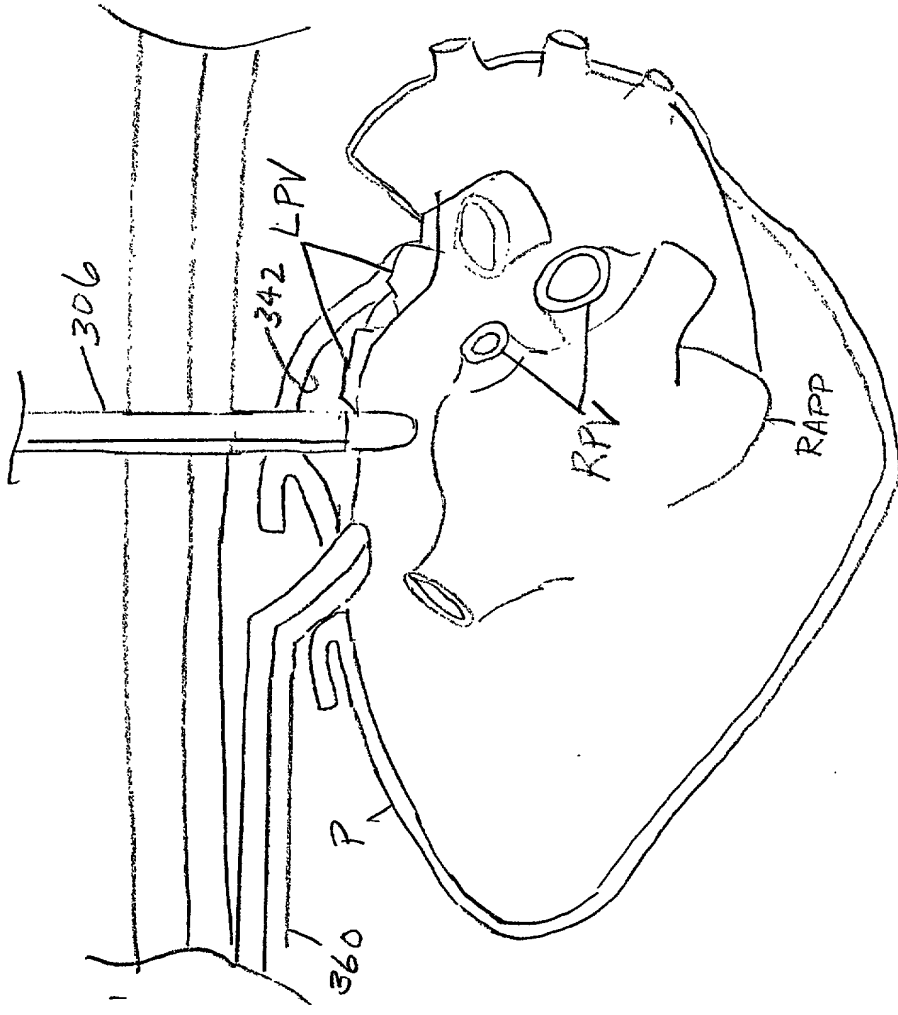


FIG 89

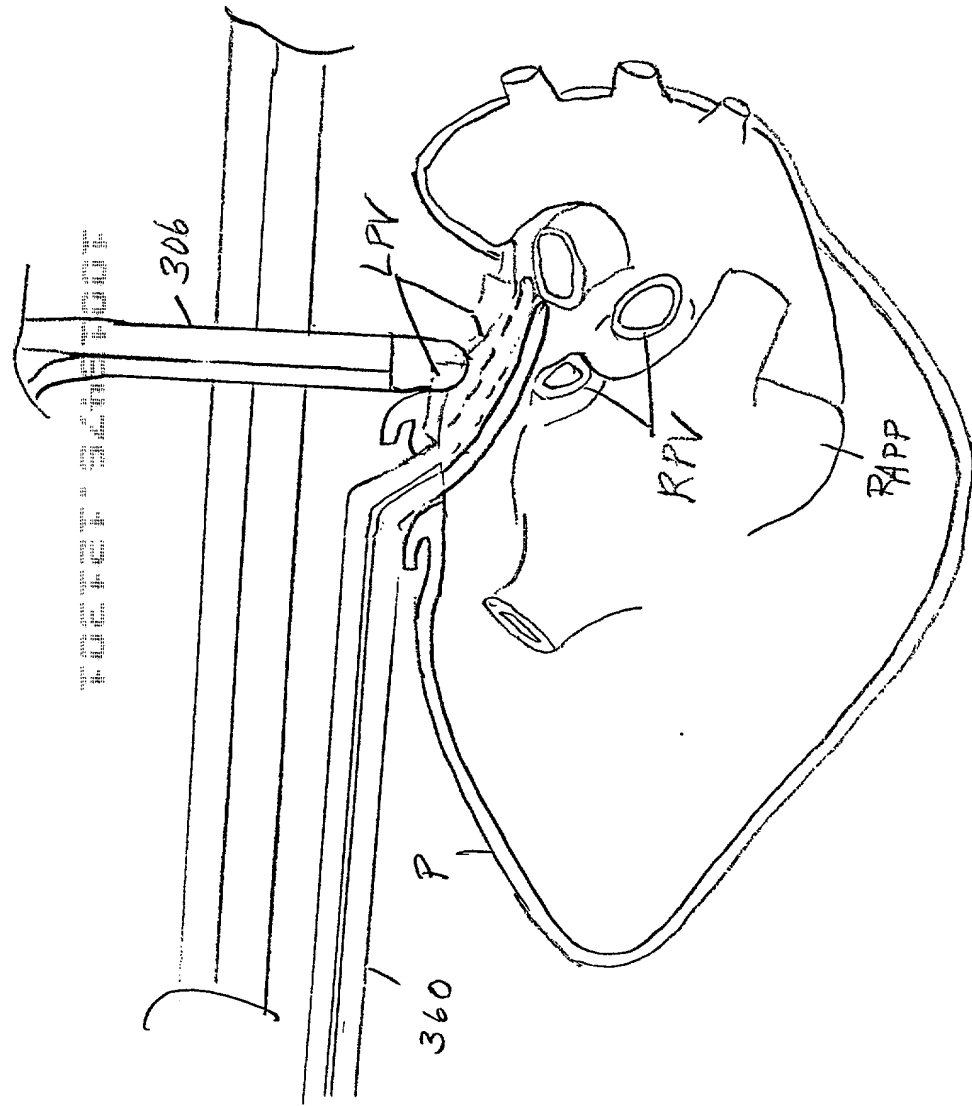


FIG. 90

Patent & Trademark Office

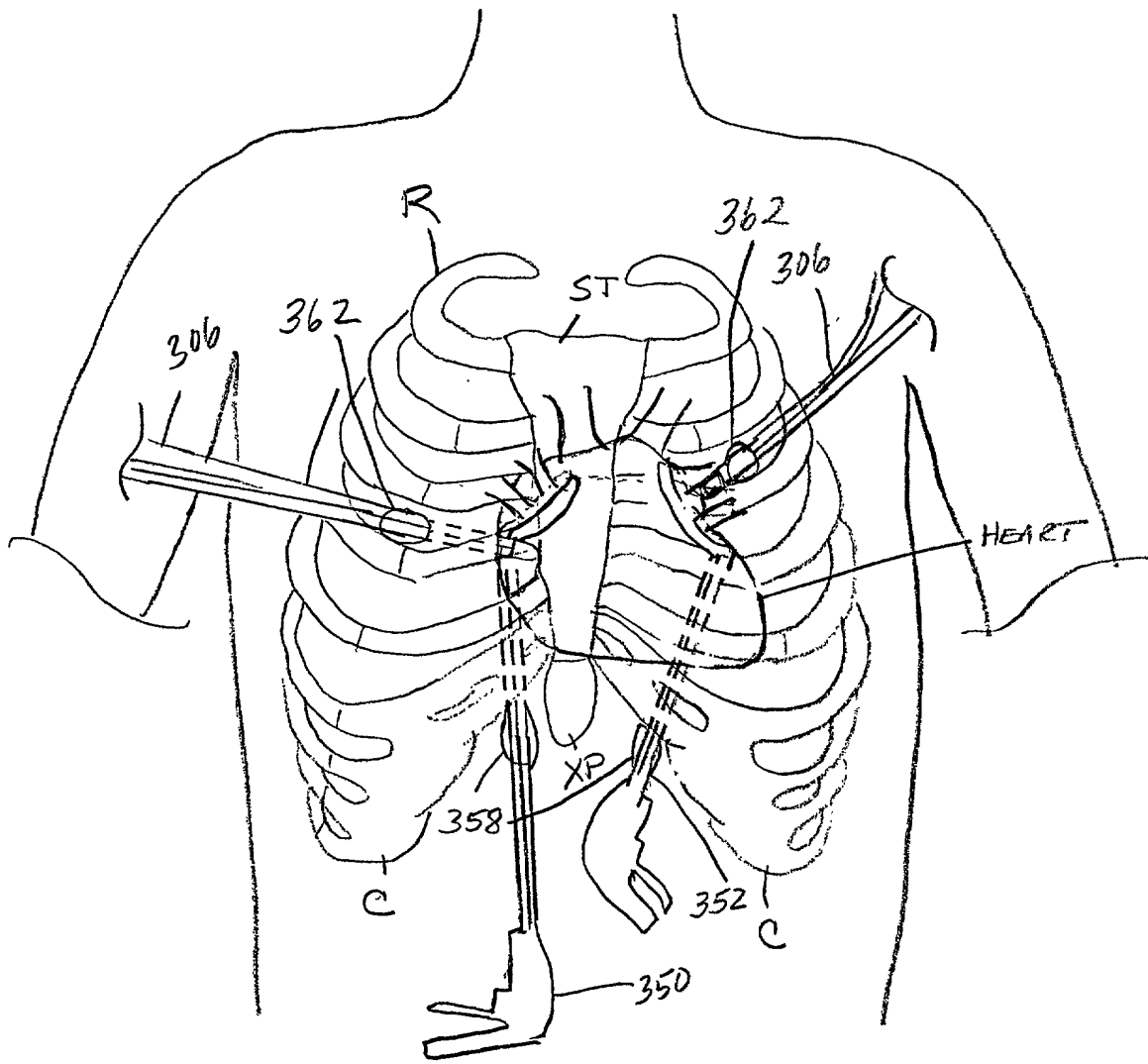


FIG 91



FIG. 92

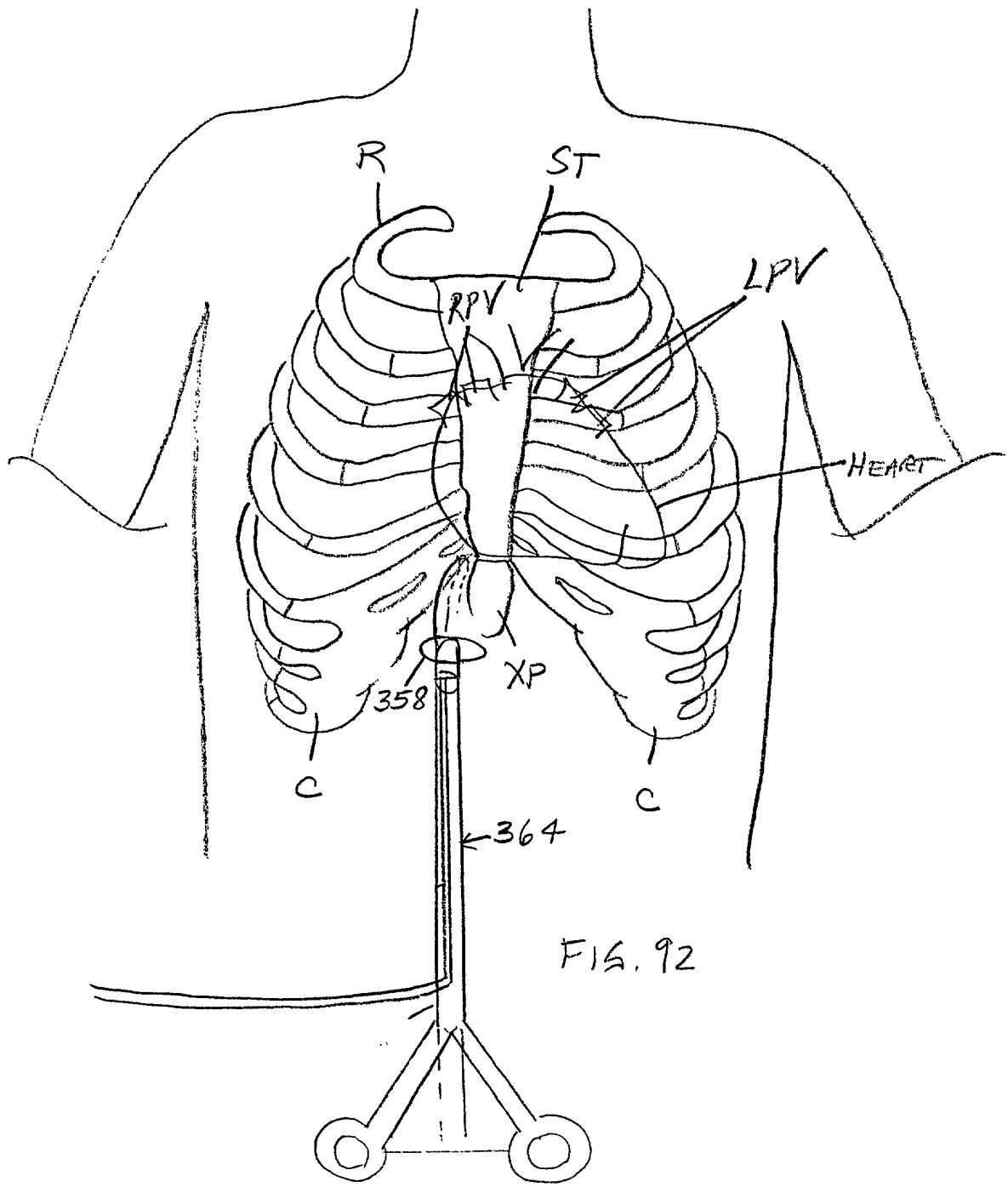


FIG. 92

FIG. 93 is a schematic diagram of a heart with a catheter system inserted into the right ventricle. The catheter system includes a main catheter (364) and a side branch (342) that is inserted into the right ventricle (RV) through the right atrium (RA). The right atrium (RA) is shown with the right ventricle (RV) below it. The right atrium (RA) is shown with the right ventricle (RV) below it. The right atrium (RA) is shown with the right ventricle (RV) below it.

X

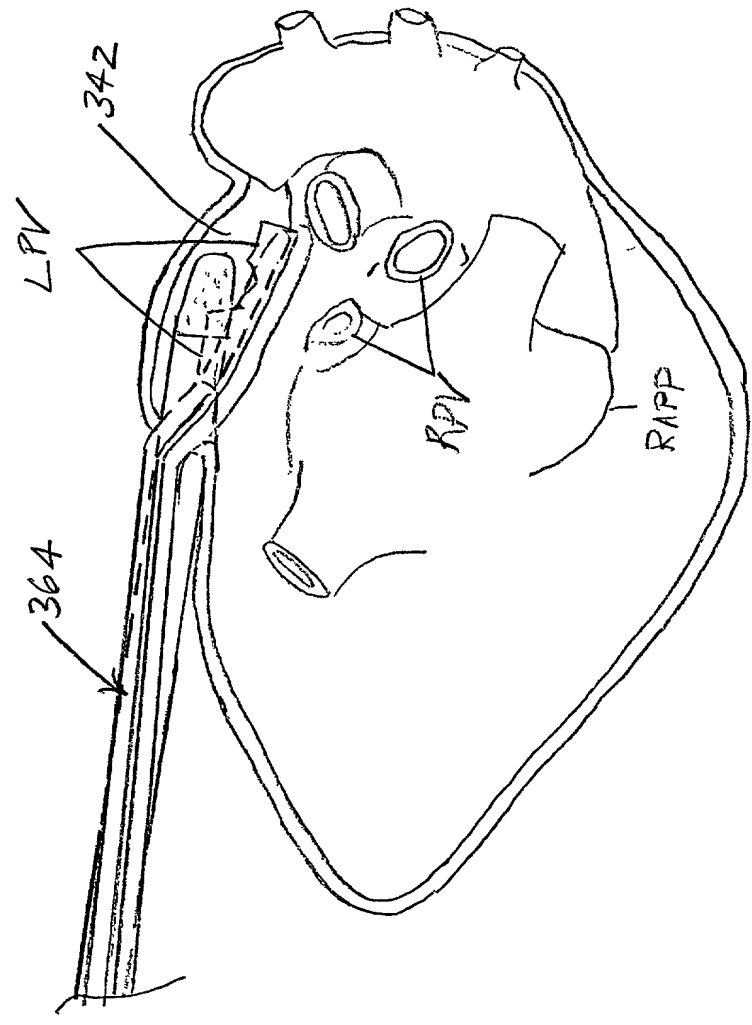


FIG 93

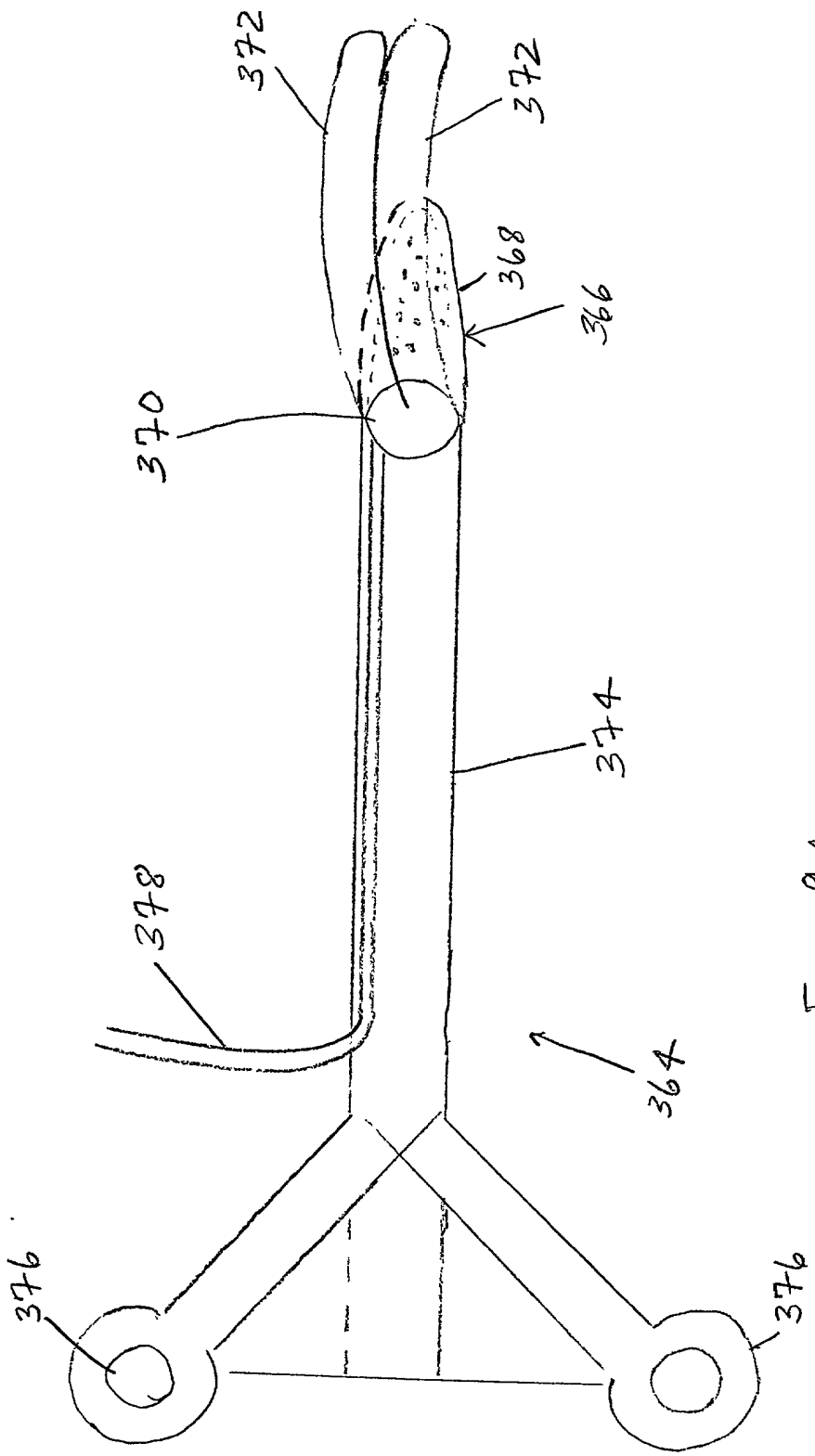


FIG. 94

FIG. 95 is a perspective view of the device in accordance with the present invention, showing the device in a closed position.

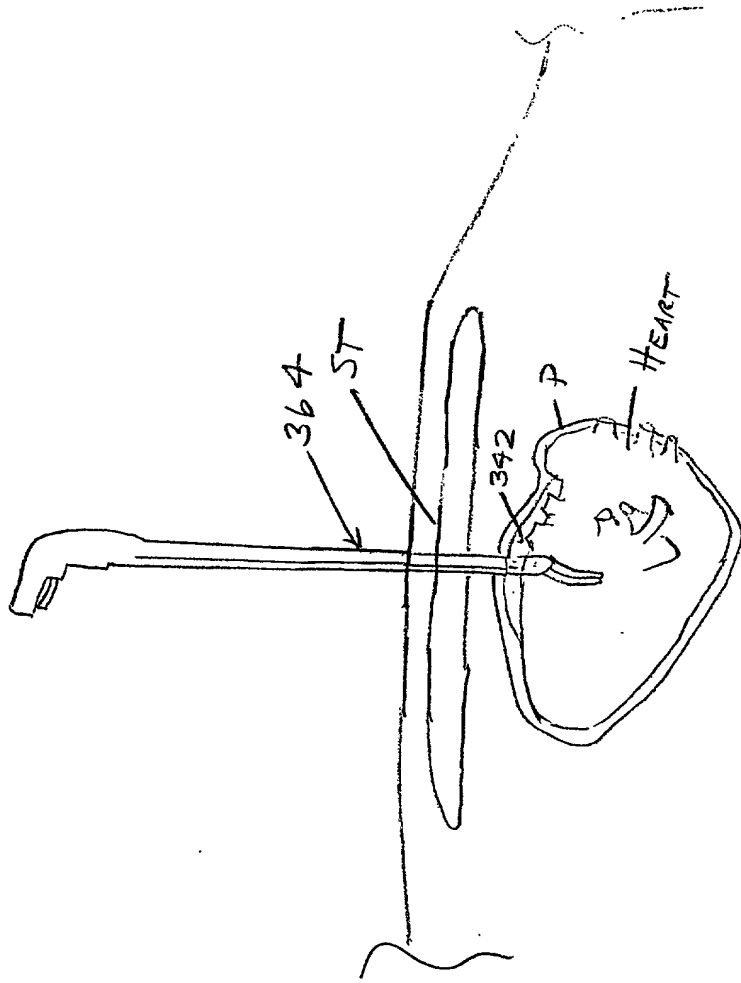


FIG. 95

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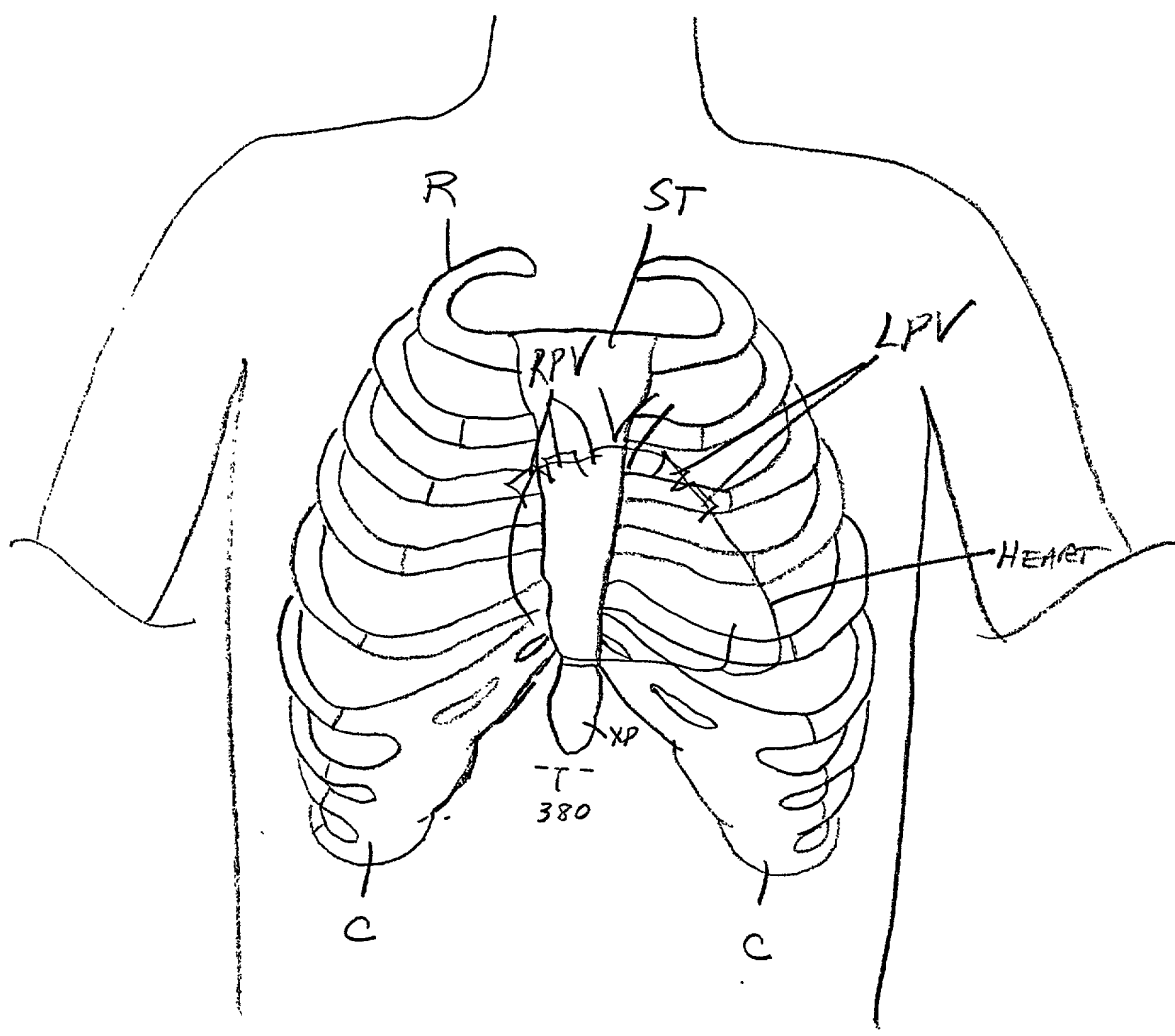


FIG. 96

FIG. 97

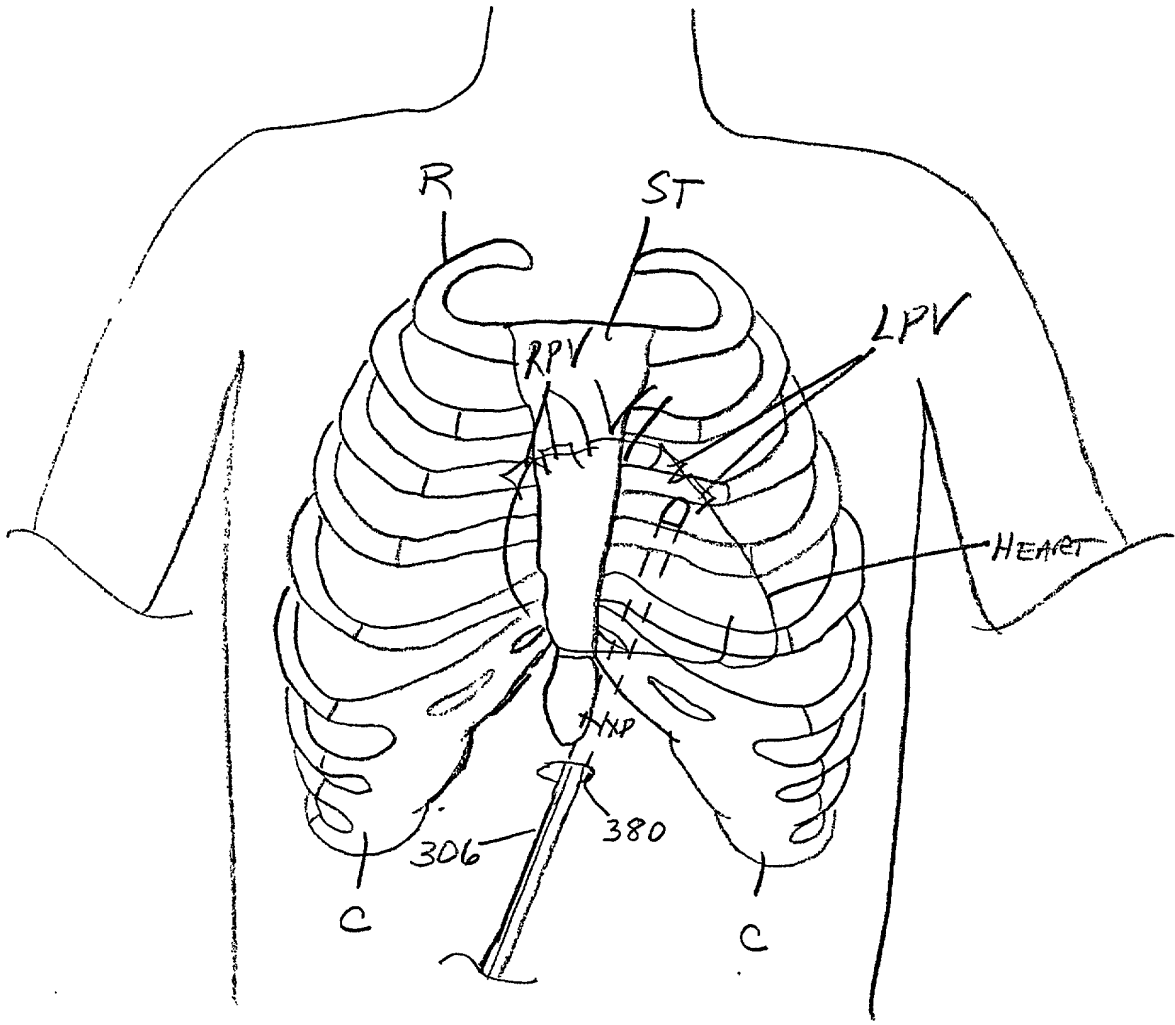
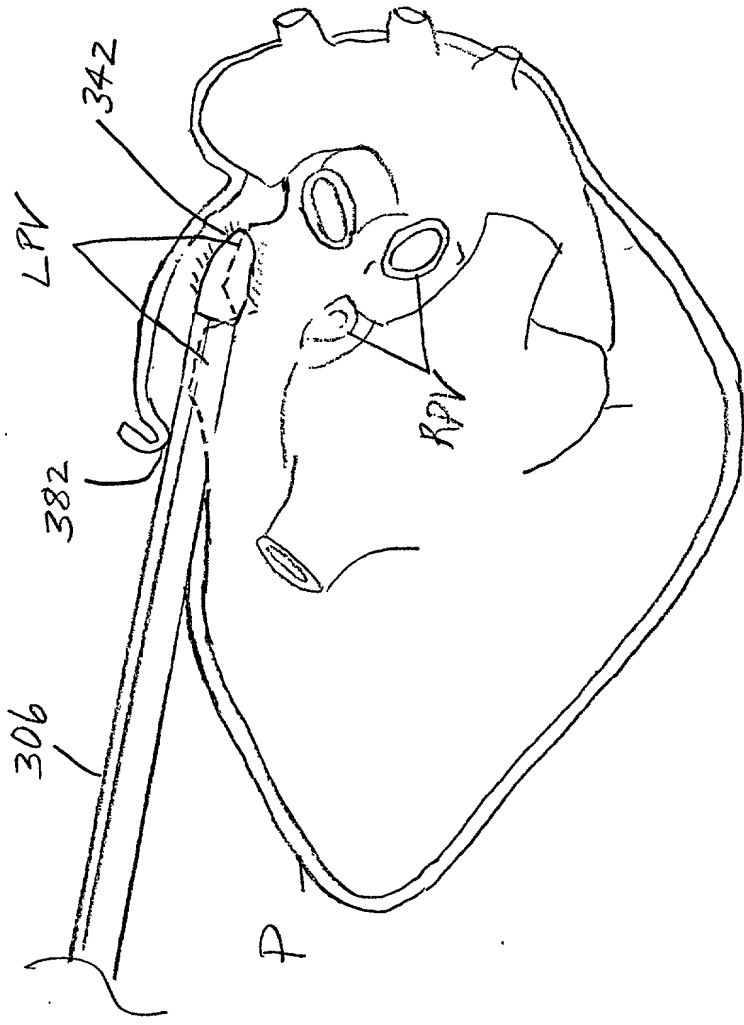


FIG. 97

FIG. 98 is a schematic diagram of a heart with a catheter system inserted into the right ventricle (RV) and the left pulmonary vein (LPV). The catheter system includes a main catheter (306) and a side branch (382) that branches off to enter the LPV. The side branch (382) is shown with a textured, possibly porous or filter-like, tip (342) positioned within the LPV. The heart is labeled with 'P' for the pulmonary artery and 'RV' for the right ventricle. The diagram illustrates the anatomical relationship between the catheter system and the heart's internal structures.



X

FIG. 98

X

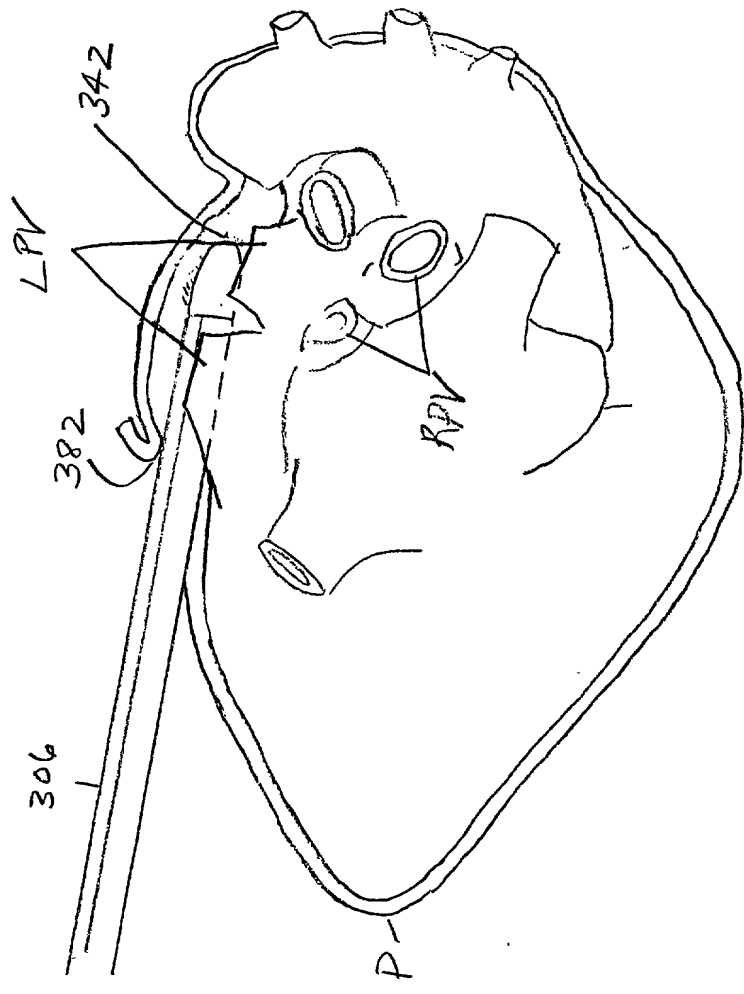


FIG. 99



FIG. 100

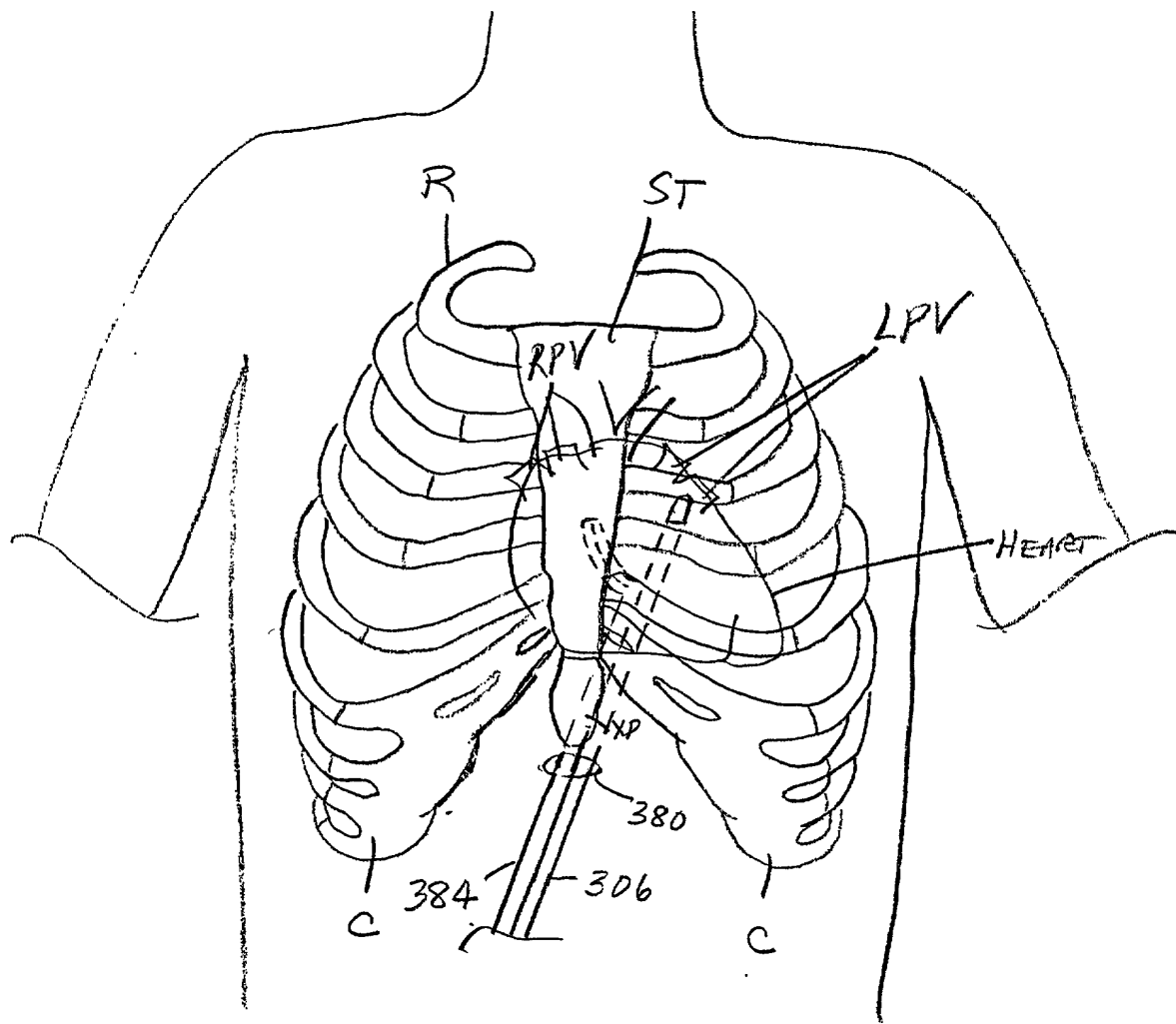


FIG. 100

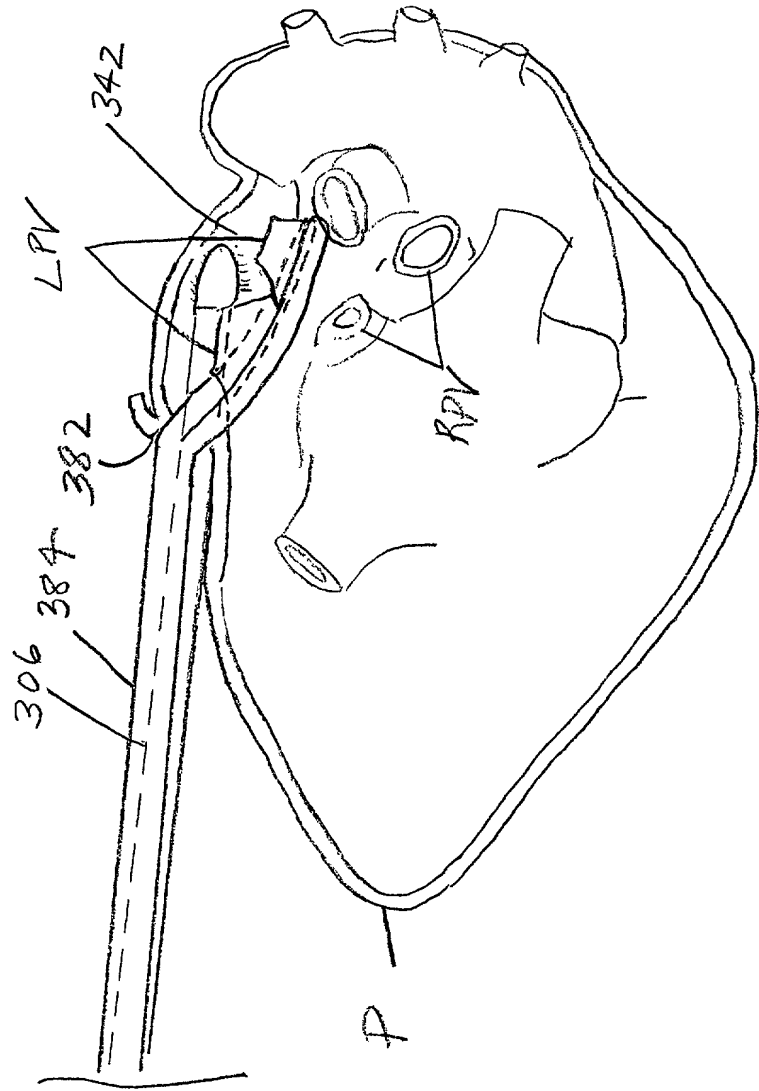


FIG. 101